GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

Hand in Hand with the GAS INDUSTRY

Nowhere is the inspiring phrase of "United we Stand" more fully typified than in the Gas Industry.

Its members stride forward shoulder to shoulder—always contributing to the common welfare—constantly pulling towards the goal of perfection—constantly developing a greater industry.

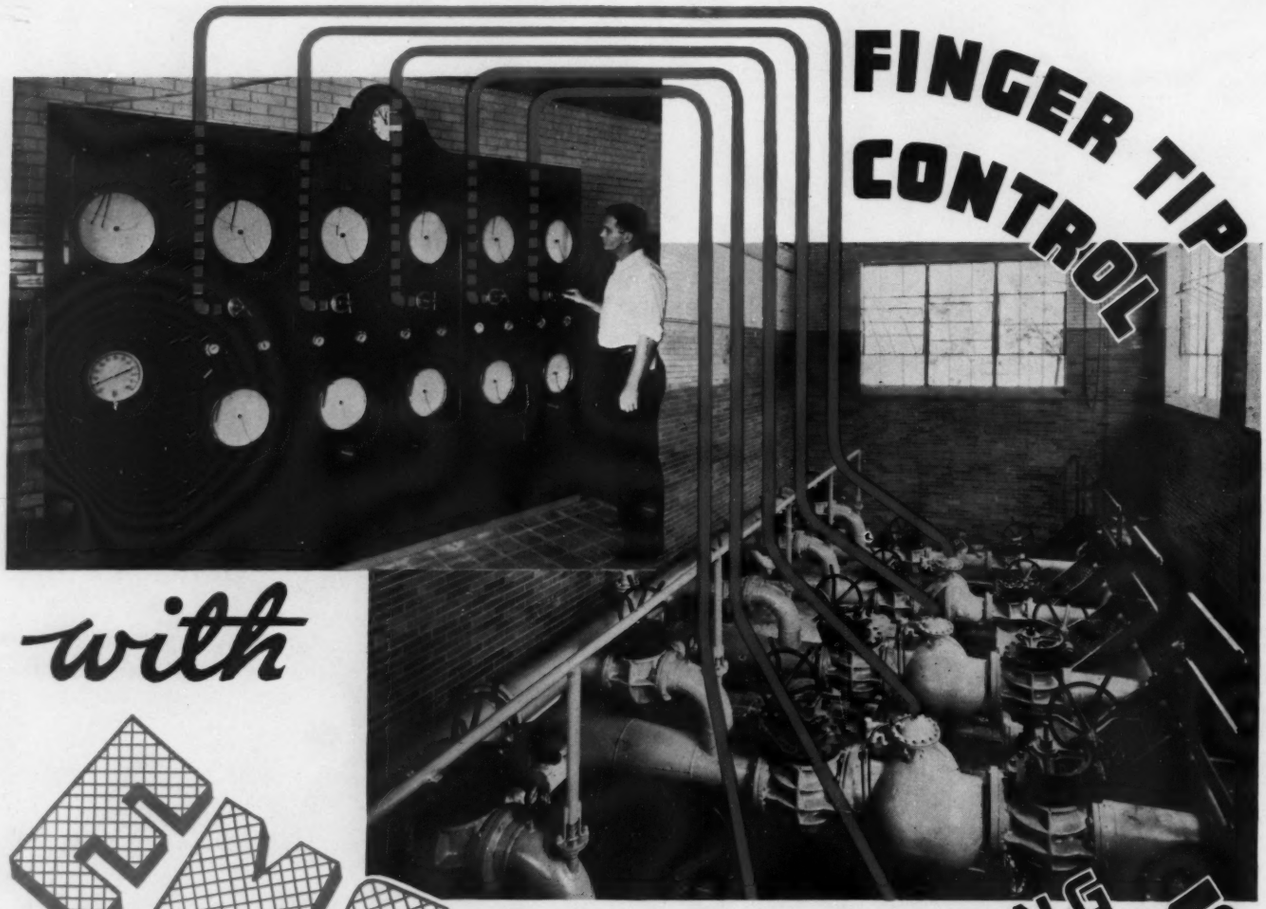
In the field of appliance-accessories Robertshaw has played its part. Long experience, finely equipped laboratories, unceasing effort—all are at the service of the industry, contributing toward perfection in automatic heat regulation for cooking, heating and industrial equipment.

The Robertshaw Thermostat Company salutes the members of the Gas Industry and pledges its continued endeavor to match accomplishment with accomplishment in the drive towards the common goal.

ROBERTSHAW THERMOSTAT COMPANY • Youngwood, Pa.

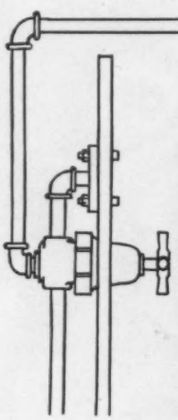
NOVEMBER 1937 • • 25 CENTS

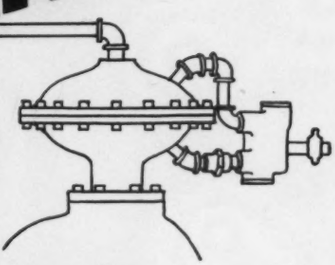
FINGER TIP CONTROL



with

EMCO PILOT LOADING REGULATORS





Progressive gas companies are now using "switchboard control" for dispatching gas—a method made possible through EMCO's advances in pressure regulation. Complete and accurate control, within ounces, for the high pressure distribution mains illustrated above, is obtained through the use of the EMCO Pilot Loading System. The Pilot Loading Regulators, located at the control panel, accurately govern the loading pressure on the main regulator diaphragms and permit the outlet pressures at the main regulators to be varied by finger-tip control from this central point.

The EMCO Pilot Loading System is fully described in our Bulletin No. 1006. Write for your copy.

PITTSBURGH EQUITABLE METER CO.

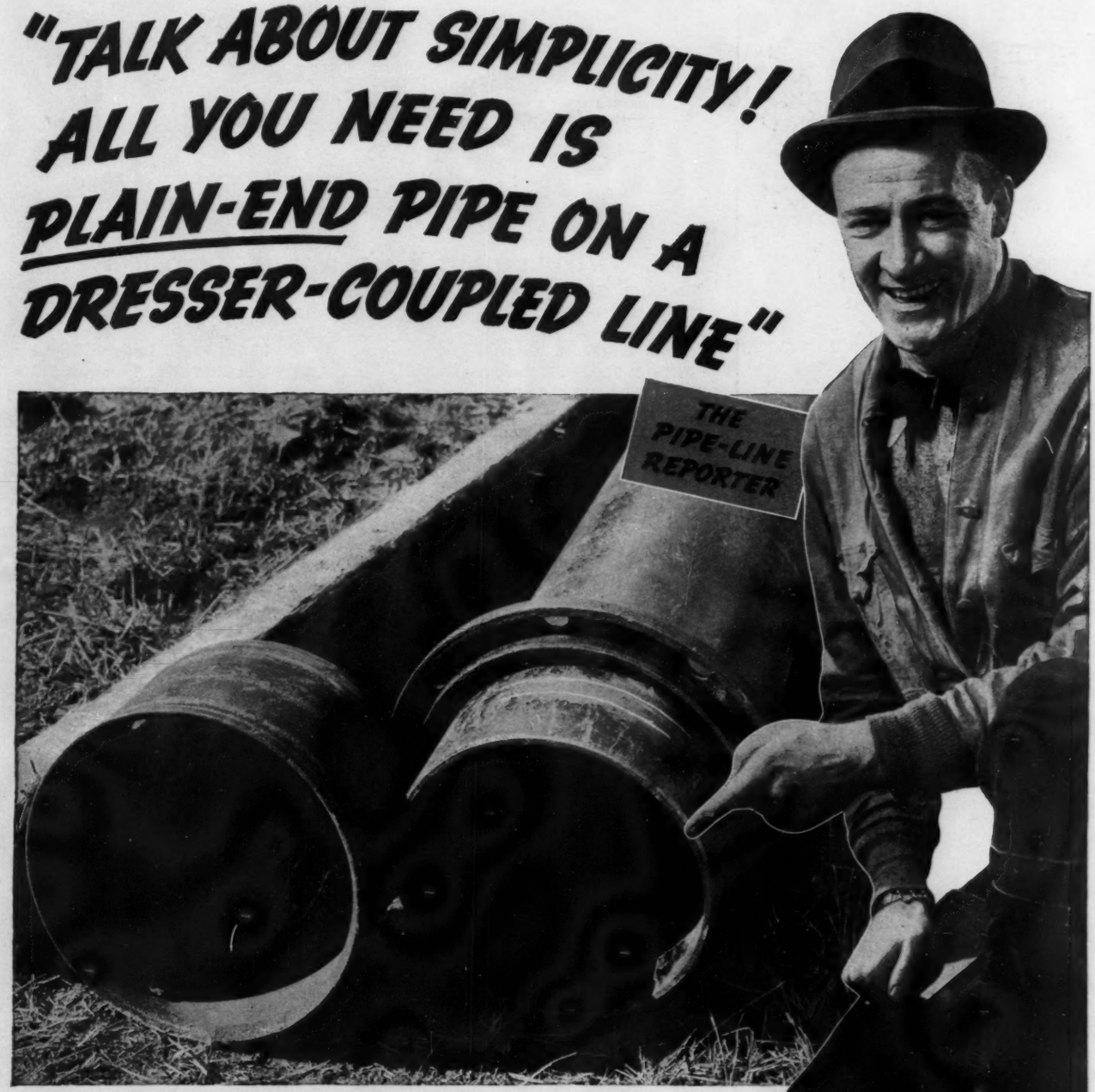
MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA

ATLANTA · BUFFALO · CHICAGO · MEMPHIS

NEW YORK · COLUMBIA · KANSAS CITY · PHILADELPHIA · TULSA · HOUSTON · LOS ANGELES · OAKLAND

"TALK ABOUT SIMPLICITY! ALL YOU NEED IS PLAIN-END PIPE ON A DRESSER-COUPLED LINE"



Why expect the *pipe* to bear any part of the jointing job? It's simpler to place the whole responsibility on Dresser Couplings. Then, you merely specify "plain-end pipe," and ELIMINATE the need and expense of: (1) special preparation of the ends; (2) damage to pipe ends during handling; (3) reduction of wall thickness and strength, especially where corrosive action is present; (4) exact alignment of ends, prior to jointing; (5) exact lengths of pipe.

Note to Reader

This is the ninth in a series of advertisements dramatizing one engineer's experience with his first Dresser-coupled line. For the complete story, write for Bulletin No. 351.

S. R. DRESSER

MANUFACTURING CO., BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front Street, West, Toronto, Ont.

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Reg. U. S. Pat. Off.

Formerly Western Gas

LOS ANGELES	CHICAGO	HOUSTON
810 South Spring Street	1064 Peoples Gas Building	306 Shell Building
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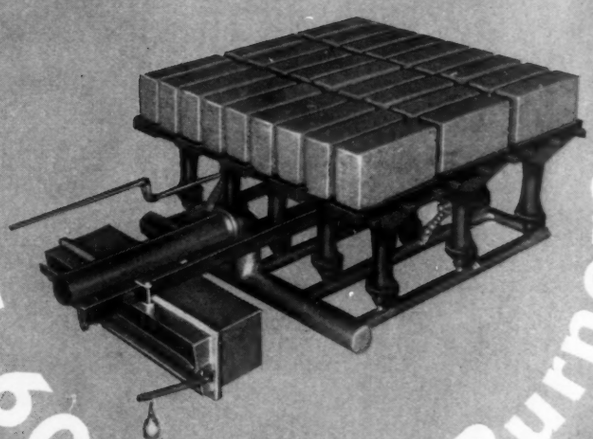
THE TREND IS TO

WECO-N.G.E. 600 Series Burners



THE WEBSTER ENGINEERING COMPANY

Tulsa, Oklahoma

Division of

SURFACE COMBUSTION CORPORATION TOLEDO, OHIO

Pacific Coast Distributors

NATURAL GAS EQUIPMENT, INC.—LOS ANGELES—SAN FRANCISCO

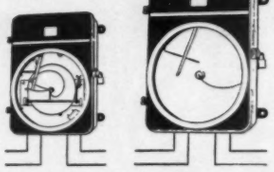
F. J. Evans Engineering Co. - Birmingham Gas & Heating Specialty Co. - Dallas Mechanical Equipment Co. - Houston

CLIP and file this page!

Here is a panorama of the latest Bristol's developments that offer you a real opportunity for improving your operating economies. Don't throw it away,—but file for future reference. Then, when you are ready, we shall gladly supply full information. The sooner—the better for both of us.

IN DISTRIBUTION DIVISION

LIQUID-FILLED THERMOMETER, Model 40M,
For accurately measuring gas line temperatures. Fully compensated for fluctuating atmospheric temperatures along connecting tubing.



METAMETER ELECTRIC TELEMETERING SYSTEM.
For long distance transmitting, recording and controlling of pressure and temperature.

MILLIVOLTMETER, Model 424.
For making electrolysis surveys.

IN INDUSTRIAL GAS UTILIZATION

DIRECT-SET MERCURY-CONTACT TEMPERATURE CONTROLLER, Model G240L.

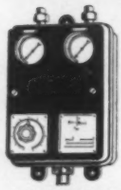
TRAVELING OVEN TEMPERATURE RECORDER, Model 169.

PYROTROL, Model A105.
A new safety device that protects gas-fired ovens and furnaces against pilot flame failure and other dangerous hazards.

PYROMASTER POTENTIOMETER PYROMETER CONTROLLER

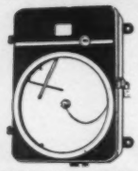
WIDE-STRIP POTENTIOMETER PYROMETER, Model 427.

IN PLANT DIVISION



AIR-OPERATED CONTROLLER, Model 90,
For temperature, liquid level and pressure.

AIR-OPERATED FREE VANE LOW RANGE DRAFT RECORDER CONTROLLER, Model D40M,
For stack draft and coke plants.



FLOW METER, Model 1140MF,
For indicating, recording, controlling, integrating flow. Integrator compensates for line pressure. Meter records rate of flow and also, when so ordered, line pressure and temperature.

WIDE-STRIP POTENTIOMETER, Model 427.
For water gas machine temperatures.

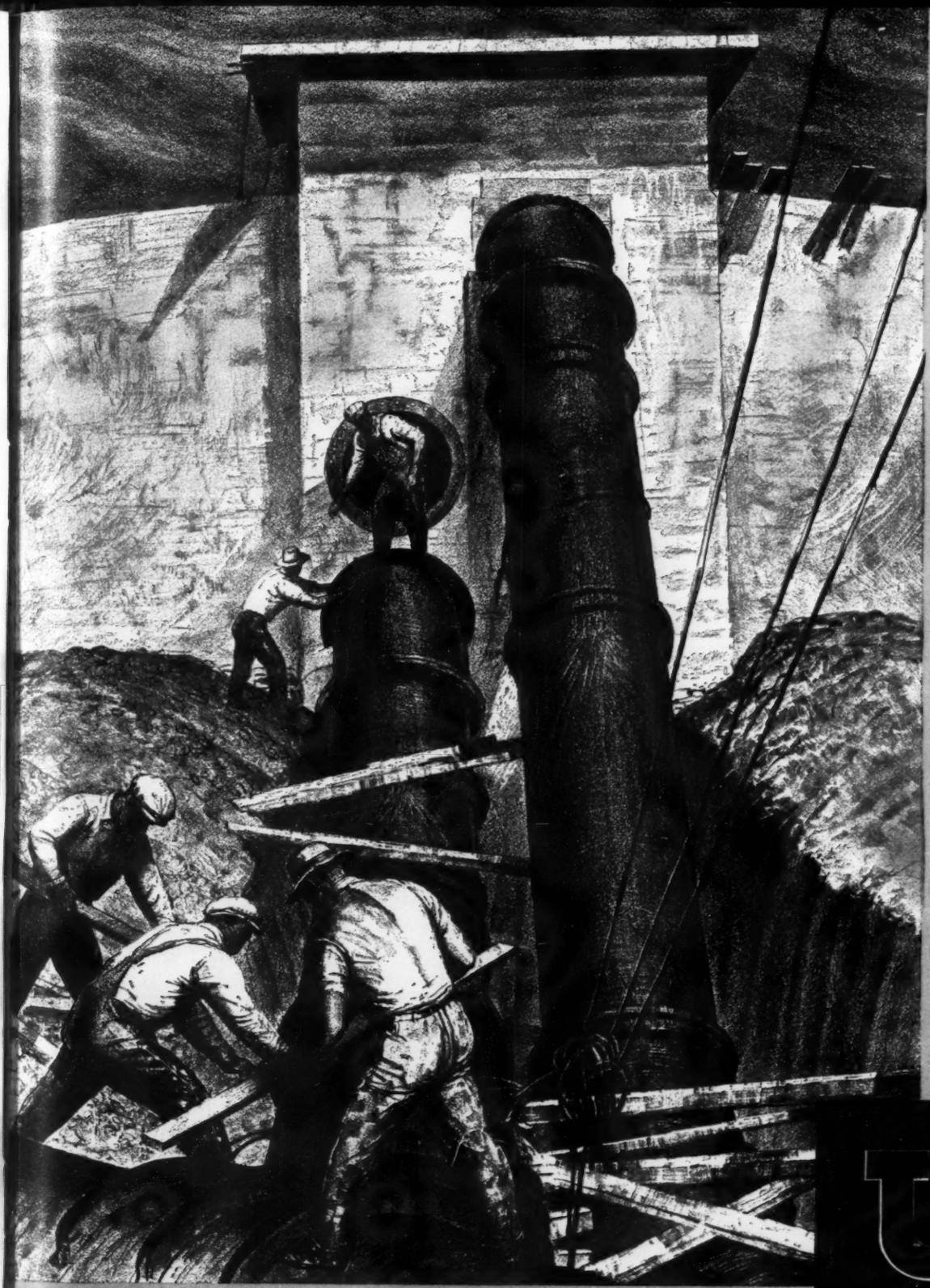
AMPLISET FREE VANE RECORDER CONTROLLER, Model 5040M.
With adjustment for sensitivity or lag. For controlling temperatures in ammonia and light oil recovery.

SMALL BULB GAS FILLED THERMOMETER, Model 340M,
For obtaining temperatures within piping of small diameter or within other cramped spaces.

THE BRISTOL COMPANY • WATERBURY, CONNECTICUT • Branch offices in principal cities

BRISTOL'S

TRADE MARK REG. U.S. PAT. OFF.



Lithographed on stone by James E. Allen for U. S. Pipe & Foundry Co., Copyright 1937, U. S. Pipe & Foundry Co.

THE ONE MATERIAL for *permanent* underground conduits whose fitness for the purpose cannot be doubted is cast iron pipe. For more than two centuries cast iron pipe has demonstrated its ability to withstand corrosion and the stresses of underground service. And today, with higher metallurgical and manufacturing standards, the cast iron pipe produced by our foundries has greater margins of safety than ever. U. S. Super-de Lavaud Cast Iron Pipe—centrifugally cast in a metal mold without chill—has extraordinary impact-strength, compressive-strength and beam-strength to combat the shocks and stresses of handling, transportation and underground service.

SUPER-DE LAVAUD CENTRIFUGAL CAST IRON PIPE

U. S. Pit Cast Pipe
U. S. Threaded Cast Iron Pipe
U. S. Mechanical Joint Pipe
U. S. Ni-Resist Cast Iron Pipe
U. S. Flexible Joint Pipe
U. S. Cast Iron Culverts
Alloy and Gray Iron Castings
U. S. Cast Iron Roof Plates

U.S. cast iron PIPE

Cast iron and alloy cast iron pipe centrifugally or pit cast—for water works, gas, sewerage and drainage service as well as industrial uses involving corrosives.

U. S. PIPE & FOUNDRY CO.
BURLINGTON, NEW JERSEY
Foundries and Sales Offices throughout the U. S.

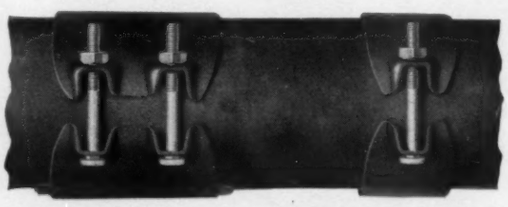
"I'll fix that pipe leak in a jiffy with this clamp . . . and SAVE MONEY, too."

Any maintenance man will say the same thing if he is equipped with Skinner PRESSED STEEL ECONOMY CLAMPS . . . which save valuable time and money every day for hundreds of gas companies.

For the instant, lasting repair of badly pitted and corroded pipe lines, Pressed Steel Economy Clamps offer amazing savings . . . actually less than home-made cost. Easily, quickly applied by anyone. Later, if desired, the half covering the leak can be welded on as a patch . . . and the other half used over again.

Pressed Steel Economy Clamps are exceptionally strong . . . heavy enough to outlast the pipe itself. Write for prices and discount . . . also the new Pipe Repair Handbook, yours for the asking.

These clamps are made from strong, hot-pressed steel plate with integral wedge-shaped lugs. Enameled and equipped with cadmium-plated steel bolts. Single bolt width 3½" . . . complete with rubber cone gasket riveted in. Two bolt width 6½" . . . with strip gasket.



DOUBLE BOLT WIDTH SINGLE BOLT WIDTH

M. B. SKINNER CO. *Est. 1898* SOUTH BEND, IND.

"No use trying—

This is a Gas Town!"

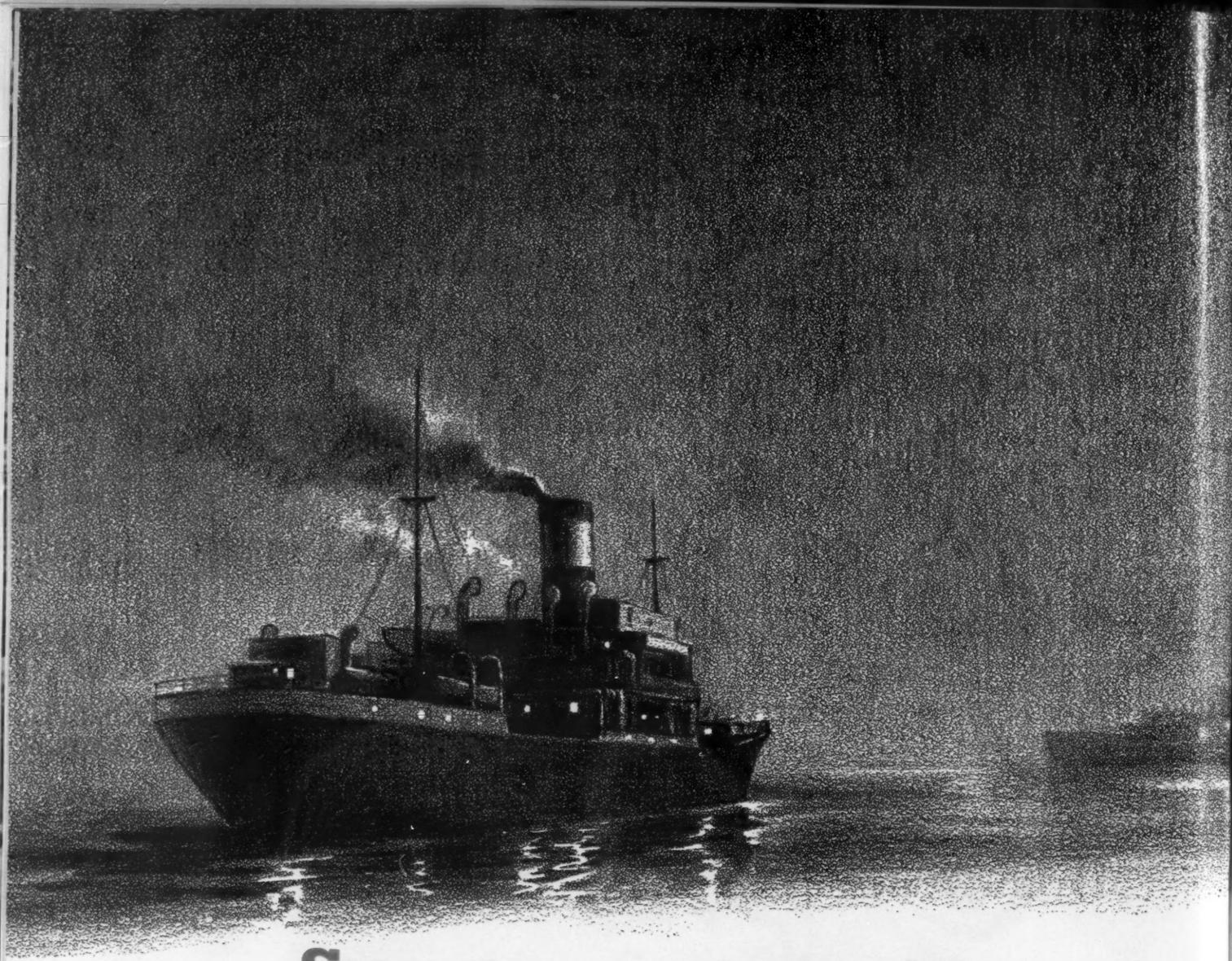
CLEAN GAS MAKES SATISFIED CUSTOMERS

Competition is up against a stone wall where people are sold on the comfort, convenience, and economy of good, clean gas. But you can't afford to rely upon "home-made" equipment to keep enthusiasm for gas up and complaints down. Today the smaller apertures and more delicate mechanism of modern gas appliances demand cleaner gas than ever before. The way to insure continuous delivery of clean gas is to install BLAW-KNOX Gas Cleaners. They will help you to make progress in the face of any competition. Leading operating engineers the country over prefer them.

GAS CLEANERS BY

BLAW-KNOX COMPANY

FARMERS BANK BLDG.
PITTSBURGH, PA.

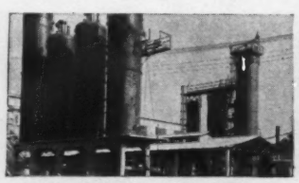


Ships that pass in the night

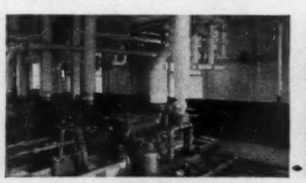
Dim, shadowy forms on the horizon—the faint gleam of lights, the sound of music and voices—all fade into the mist and are gone. Many of the builders and engineers to whom construction jobs are entrusted are like ships that pass in the night. They are here today soliciting business and satisfactorily handling it, but gone tomorrow when service, maintenance, or replacement problems arise. That is why the Fluor policy of undivided design, engineering, and construction responsibility pays continuing structural dividends.

For over 46 years, the Fluor organization has kept abreast of oil and gas industry progress—has learned through actual experience the many and diversified structural problems that may be encountered as well as the most efficient and economical means of solving them. Many supplies of materials are necessary in the completion of a specific job, but you deal only with The Fluor Corporation, Ltd., who accepts an ***undivided responsibility.***

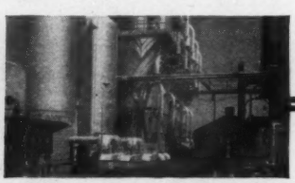
Compressor plant installation for a large California oil company.



Portion of de-waxing plant built for oil company operating in middle west.



Interior view of iso-octane plant constructed for a mid-continent oil company.



Chillers and control house in the phenol plant of a California oil company.

FLUOR BE SURE WITH FLUOR **CONSTRUCTION AND ENGINEERING SERVICE**

THE FLUOR CORPORATION, LTD. Main Office: P.O. Box 128—Station K, Los Angeles, Calif. • 909 McCormick Bldg., Chicago, Ill.
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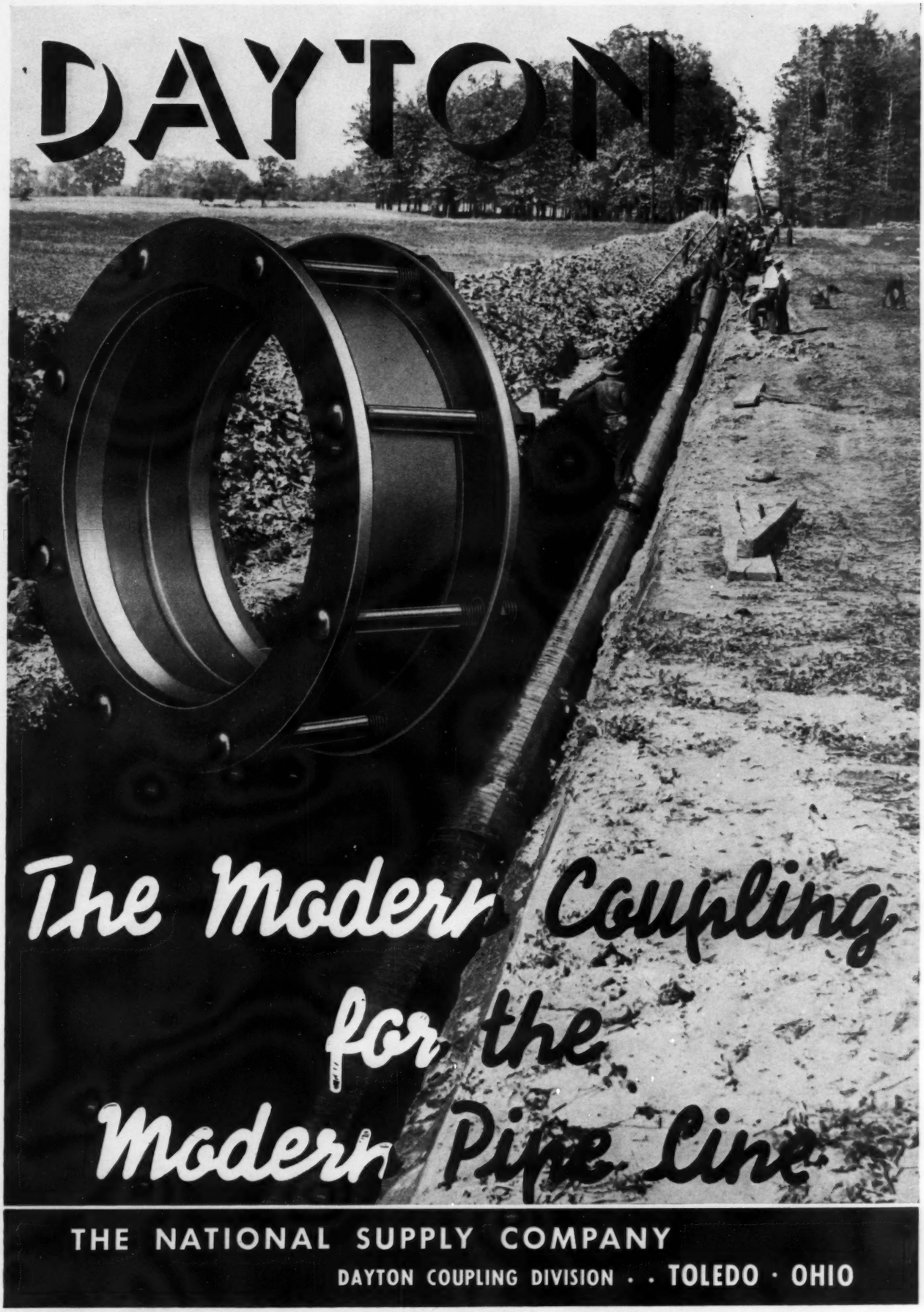
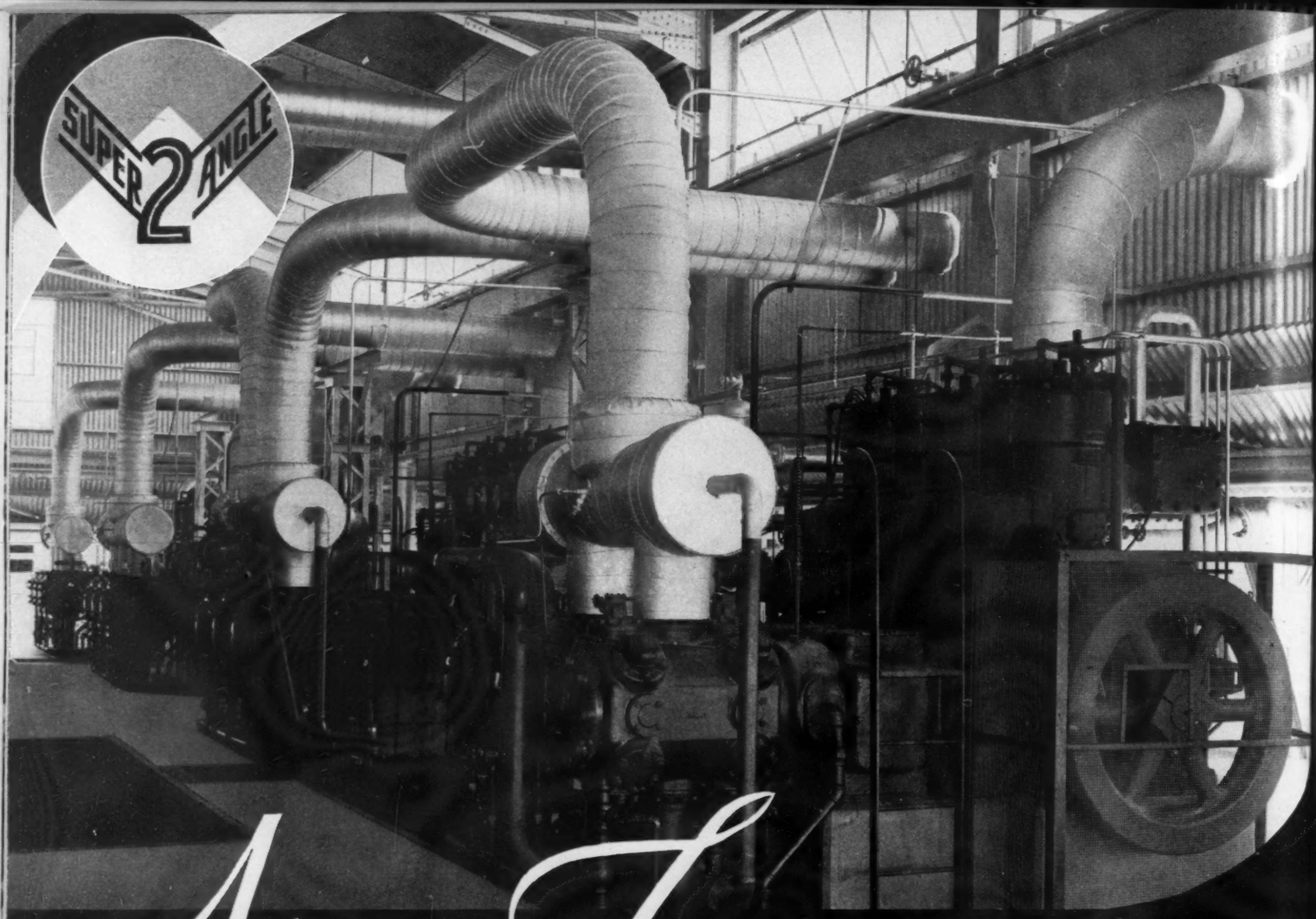

DAYTON
The Modern Coupling
for the
Modern Pipe Line
THE NATIONAL SUPPLY COMPANY
DAYTON COUPLING DIVISION . . TOLEDO · OHIO

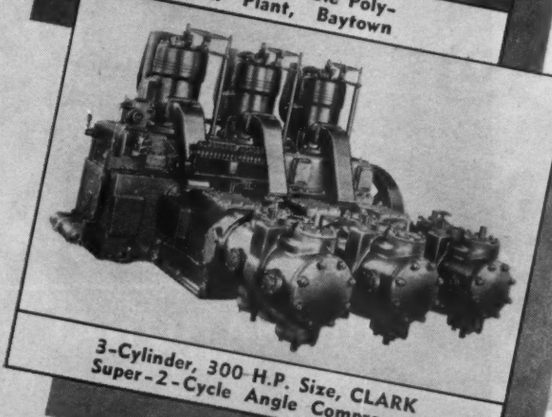


Always First IN THE FIELD!

Propane Refrigeration Compressors, Humble Oil & Refining Company Thermal Polymerization Plant, Baytown, Texas. Plant engineered and constructed by M. W. Kellogg Company.

CLARK Super-2-Angle Compressors are now widely used in refining and gasoline plants, re-pressuring plants, booster stations, etc. These compressors are achieving important savings through (1) being shipped assembled, (2) occupying less floor space, (3) minimum fuel and maintenance costs. Write for details or

Exterior View, Humble Polymerization Plant, Baytown



3-Cylinder, 300 H.P. Size, CLARK Super-2-Cycle Angle Compressor

See CLARK Section, 1937 Composite Catalog

CLARK BROS. COMPANY . . . . . Olean, New York, U. S. A.

Export Office: 30 Rockefeller Plaza, New York; Midcontinent Sales Offices and Warehouses, Tulsa, Okla., and Houston, Texas. West Coast Office: Smith-Booth-Usher, 2001 Santa Fe Ave., Los Angeles, Cal. Foreign Offices: 73 Turnmill St., E. C. 1, London, England; 4 Str. General Poetas, Bucharest, Roumania

CLARK

EASY TO INSTALL... HARD TO WEAR OUT!

● **INDOORS OR OUTDOORS,** Transite Flue Pipe assures the same continued trouble-free service. Its remarkable resistance to corrosion and immunity to weather, make it the permanent, economical solution to all your venting problems.

Offering a complete line of fittings, J-M TRANSITE FLUE PIPE provides rapid, economical assembly . . . its durability permanently solves your venting problems

THERE'S no questioning the fact that simple, quick installation is extremely desirable in a flue pipe. And when the same pipe provides *permanence*, you have a material that answers every venting problem!

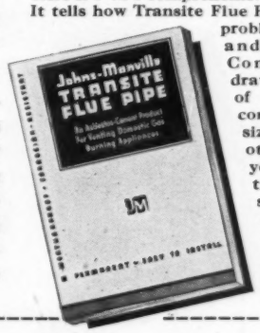
Because it embodies both these features . . . J-M Transite Flue Pipe is being installed on more and more gas-heating systems every year. Available in both round and oval form, in various capacities, Transite comes in a complete line of sizes. Hence you economize on installation because assembly is rapidly . . . easily accomplished.

Permanence is assured by Transite's asbestos-cement composition. Inherently resistant to corrosive fumes . . . absolutely weatherproof . . . it is an important safeguard to the lasting convenience of heating by gas. And the resulting years of virtually maintenance-free service will help assure complete customer satisfaction with gas-heating dependability.

In addition, Transite, with its relatively low heat conductivity, maintains stack temperatures at a higher level for longer distances . . . cuts down on flue condensation. It is exceptionally resistant to high temperatures and approved by the National Board of Fire Underwriters. And cost, considering all the advantages of this durable flue pipe, is surprisingly low!

Send coupon for new free manual

Here is J-M's comprehensive 20-page manual. It tells how Transite Flue Pipe solves venting problems permanently and inexpensively. Contains detailed drawings on every type of installation, and complete tables on sizes, weights and other details. Also, you'll find information regarding installation methods and data on the use of Transite for chimney linings.



Johns-Manville
TRANSITE FLUE PIPE

JOHNS-MANVILLE, 22 East 40th Street, New York City.
Send me your new 20-page manual on Transite Flue Pipe.

Name _____

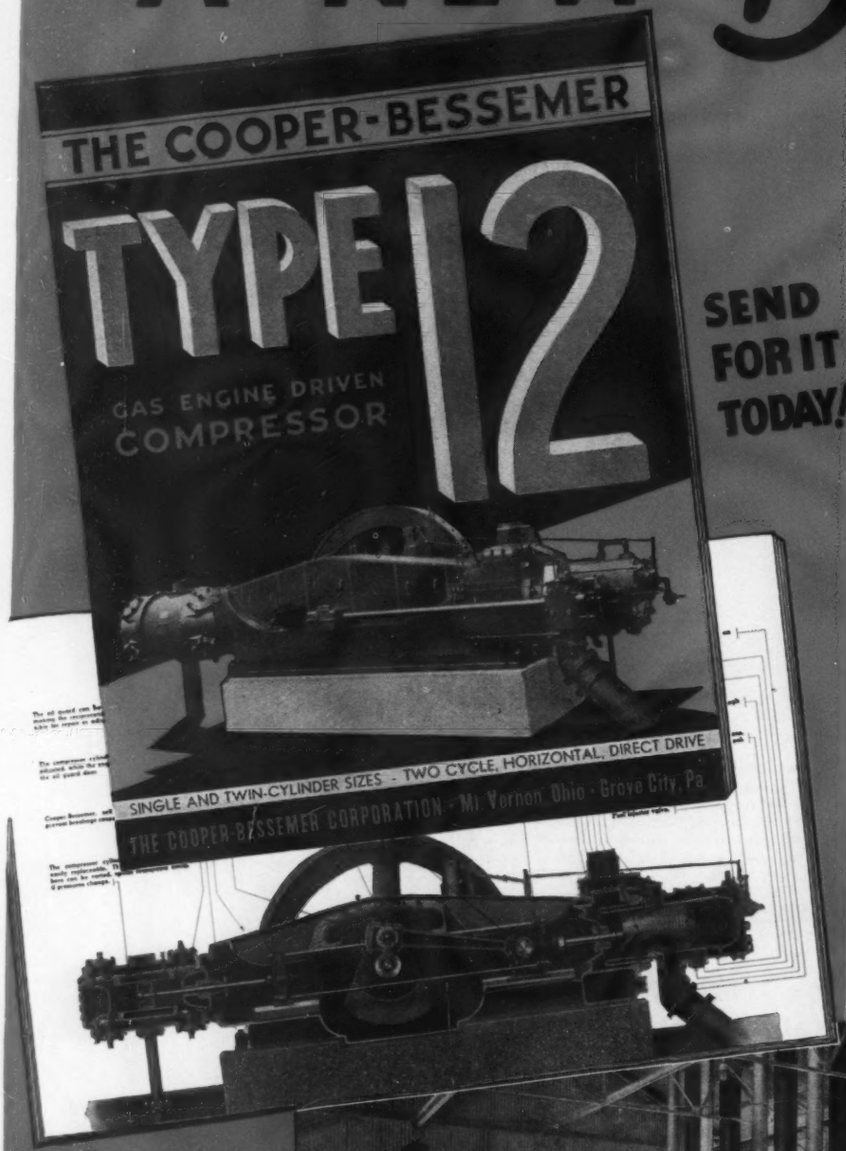
Organization _____

Address _____

G-11-37

A NEW *Bulletin*

ON "THE GREATEST ADVANCEMENT IN 2-CYCLE HISTORY"..


THE COOPER-BESSEMER
TYPE 12
GAS ENGINE DRIVEN
COMPRESSOR
SINGLE AND TWIN-CYLINDER SIZES - TWO CYCLE, HORIZONTAL, DIRECT DRIVE
THE COOPER-BESSEMER CORPORATION - Mt. Vernon, Ohio - Grove City, Pa

SEND FOR IT TODAY!

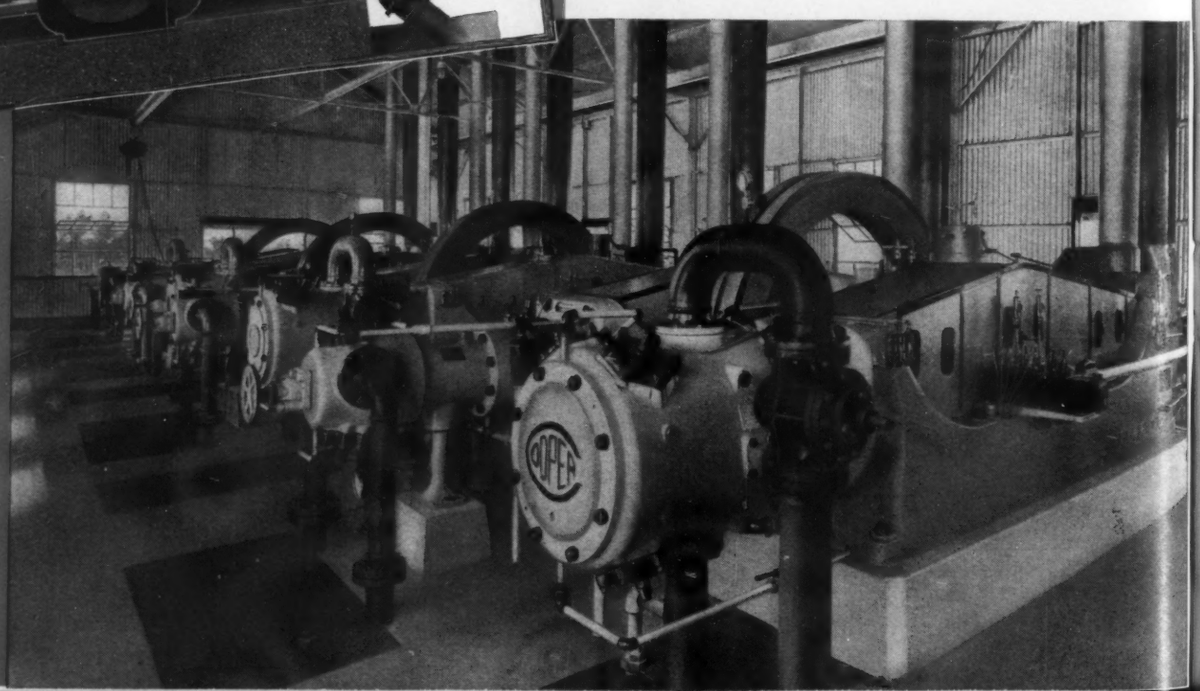
The BULLETIN

A busy engineer made these notes on it while leafing through this 20-page bulletin:

"Important — hold on top of desk. Describes effective scavenging, instant regulation, accurate fuel adjustment, complete accessibility, lifetime cylinder heads, easy scale removal, positive cooling, positive lubrication, separate magnetos, invertible exhaust, adjustable bearings, new compressor plate valve."

The COMPRESSOR

Built in two sizes — single-cylinder rated 125 H. P., and twin-cylinder rated 250 H. P. The Type 12 has greater accessibility than any previous two-cycle engine. All bearings on a twin unit — crank-pin, crosshead, and mains — can be adjusted in less than 30 minutes. All wearing parts automatically and positively lubricated. New duplex scavenging air valve principle gives more uniform operation and greater overload capacities.



Right — Four Cooper-Bessemer Type-12 twin-cylinder units in the Barnsdall Oil Company plant, at Oklahoma City, Oklahoma.

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N. G. E. SERIES 400 BURNER. For small cast iron or steel rectangular fire box boilers. Occupies little head room. Easily manifolded. Operates quietly without vibration. High capacity.

N. G. E. NO. 73-10 BURNER. For small round furnaces (warm air, hot water, steam) and vertical boilers, kettles, etc. Utilizes refractories for maximum heat liberation.

N. G. E.

CONVERSION BURNERS

FOR APPLICATION TO ALL
COMMERCIAL HEATING INSTALLATIONS

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For utilities, the Commercial Heating field represents a large portion of its potential; it therefore offers itself as one of the most vulnerable fronts in a utility load building program.

Natural Gas Equipment has a complete line of gas burners for Commercial Heating services, for installation either as original equipment or for conversion to gas. Copies of a valuable Commercial Heating Bulletin are available upon request.

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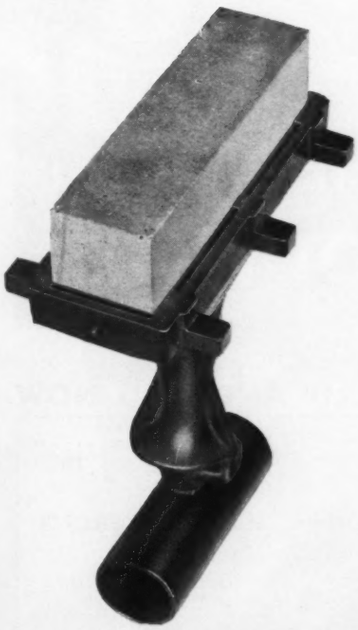

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N. G. E. TYPE R BURNER. Successfully solves conversion requirements for round furnaces. Full manifolding flexibility. Requires little or no attention.

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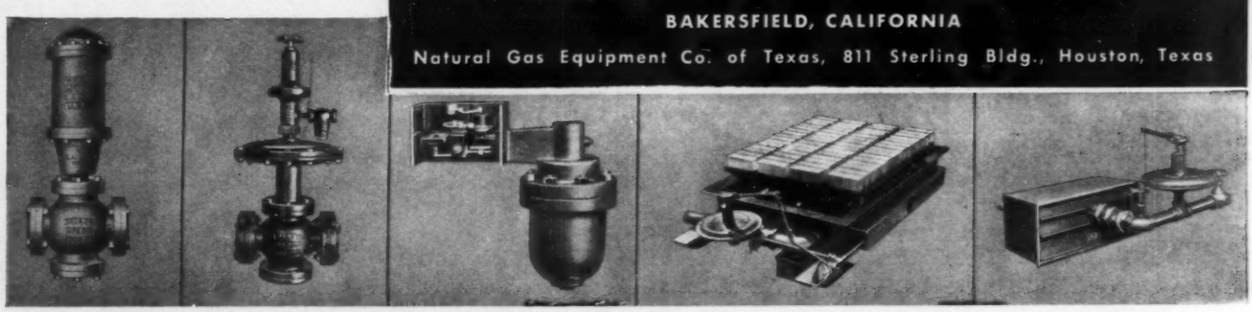

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...and create more interest in durable equipment. Utility and public both benefit from non-rust tanks

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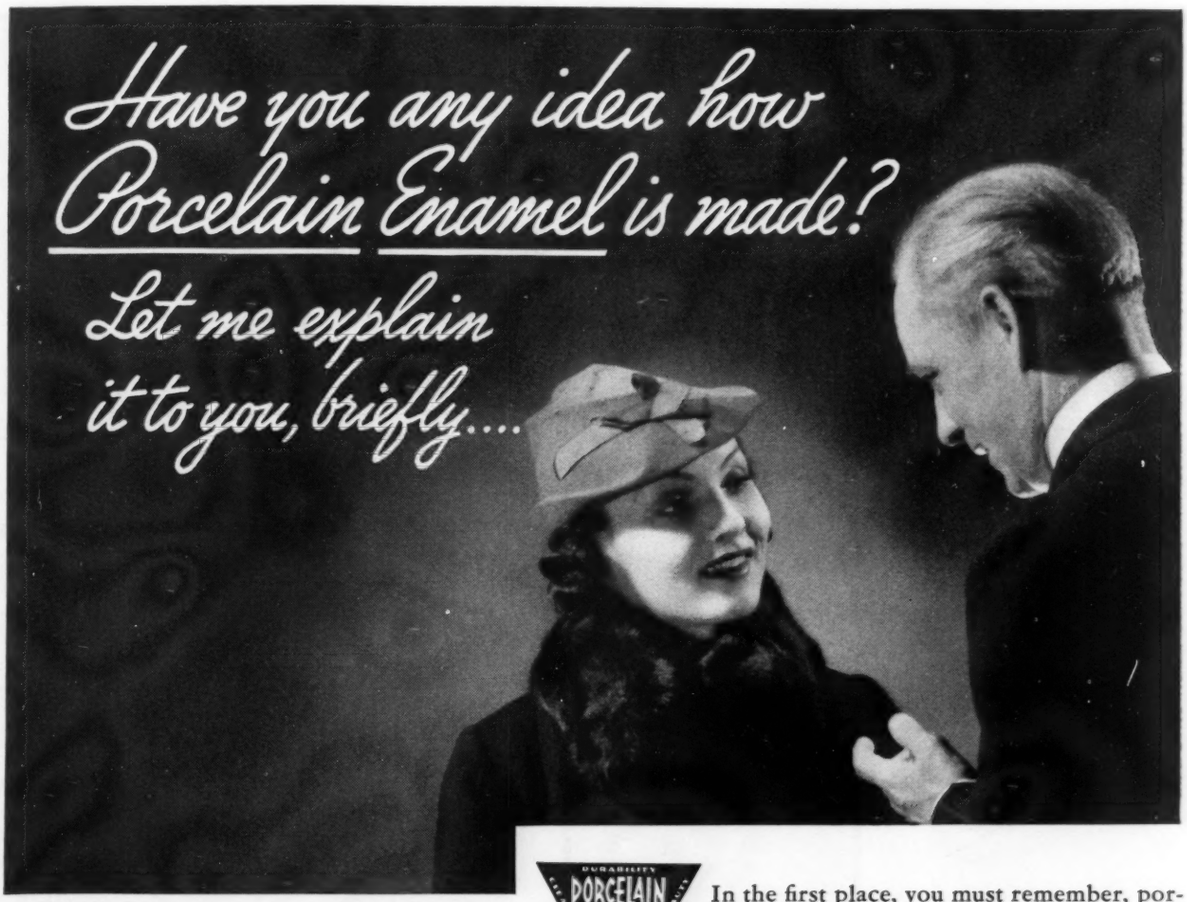

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After being very carefully proportioned these raw materials are mixed, then in huge furnaces smelted down to a molten mass like lava. After this molten rock has cooled, it is ground to a fine powder.

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ALL STAR CAST FOR YOUR SHOW OF PROFITS

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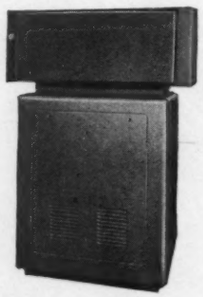

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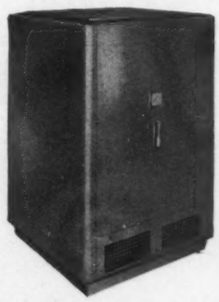
Proved better in thousands of homes. It's the world's most beautiful gas boiler. Full range of sizes.



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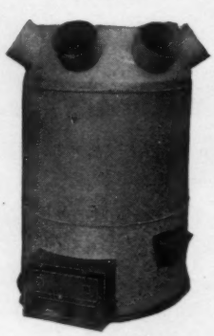
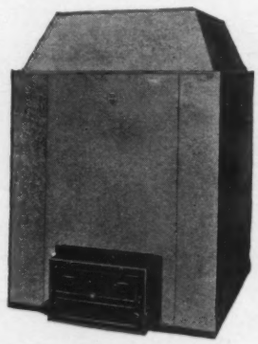
NEW GRAVITY WARM AIR FURNACE

(Round and Square Type). Scientifically engineered to provide maximum comfort with warm air. Features economy and dependability at the right price.





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Your choice of several sizes — your choice of controls.

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AGP DICTATOR STORAGE WATER HEATER

Three types. Sizes from 15 to 75 gallons. Tanks of rust-proof Arcoloy (strengthened copper) or galvanized steel.

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Provides heating for individual rooms. Economical. Attractive walnut finish.

THE big Fall sales show is on! Here, there — everywhere homeowners are in the market for new heating, air conditioning and hot water equipment.

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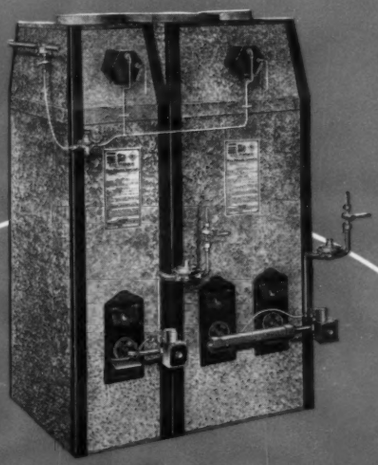

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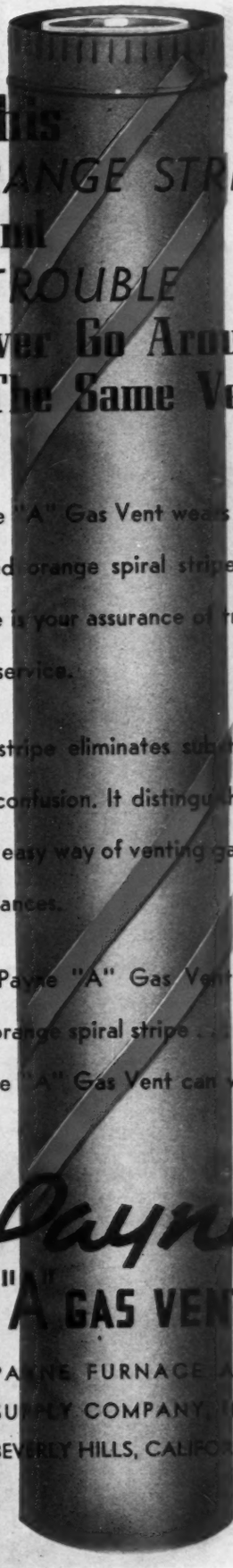

this ORANGE STRIPE and TROUBLE Never Go Around The Same Vent!

Payne "A" Gas Vent wears a registered orange spiral stripe. This stripe is your assurance of trouble-free service.

This stripe eliminates substitution and confusion. It distinguishes the safe, easy way of venting gas-fired appliances.

All Payne "A" Gas Vent wears the orange spiral stripe . . . ONLY Payne "A" Gas Vent can wear it.

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"A" GAS VENT

PAYNE FURNACE AND SUPPLY COMPANY, INC.

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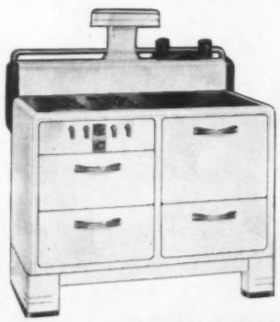
"THE COLONEL'S LADY AN' JUDY O'GRADY ARE SISTERS UNDER THE SKIN..." *but*

GAS RANGES *are Different!*

THE devices contained in a gas range determine to what extent its service performance will be truly modern, time releasing, convenient and economical.

Universal Gas Ranges contain scientifically engineered devices that make possible entirely new standards of cooking performance throughout every phase of the cooking operation.

Universal cookery is simple and certain. It eliminates those time-consuming cooking chores associated with cooking on an outmoded range. Broiling without smoke—top burner cooking with pot watching eliminated—oven cooking without testing, peeking or guesswork—all this and more, the modern Universal offers the Homemaker. The Universal is the key to cooking modernization as well as kitchen modernization.



These Adanced Features MAKE POSSIBLE THE SUPERIOR COOKING PERFORMANCE OF THE UNIVERSAL GAS RANGE

1. **Simmer-Save Burners.** Controlled boiling heat makes possible more certain, economical, convenient and healthful top burner cookery.
2. **In-A-Drawer Broiler.** Makes broiling easy, safe and effortless.
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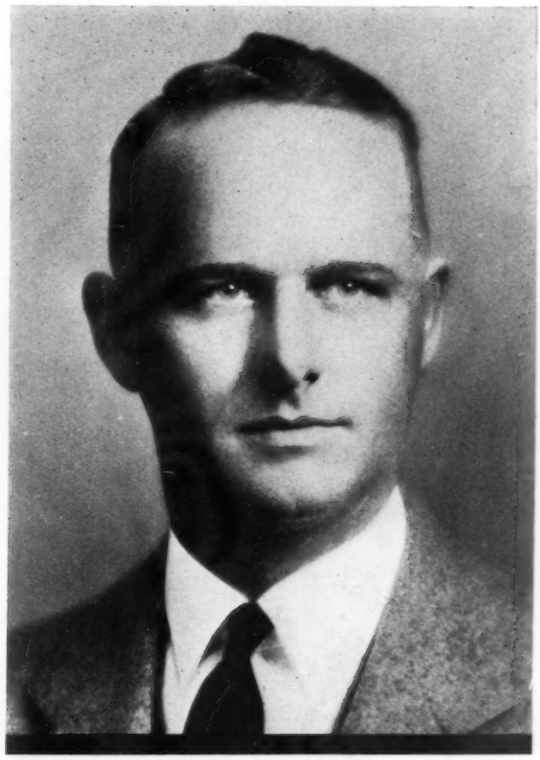
10. **Reinforced Quality Construction.** Assures freedom from troublesome repairs, and assures long life.

★ *Universal Gas Ranges* ★

MANUFACTURED BY CRIBBEN & SEXTON CO., 700 NORTH SACRAMENTO BOULEVARD, CHICAGO, ILL.

GAS
November, 1937

Guest Editorial



Competition 50%
Bugaboo 50%

By F. M. BANKS

Vice-President in Charge of Sales
Southern California Gas Company

A FAMOUS humorist once made a statement that certainly carries a moral for many of us in the gas business. He said: "The trouble with most folks is not that they don't know enough but that they know too much that isn't so."

The published thought of our industry reveals that we are considerably concerned over the subject of competition. We seem to have developed an almost feverish yearning for formulas for meeting competition, and we seem to be talking about it almost endlessly.

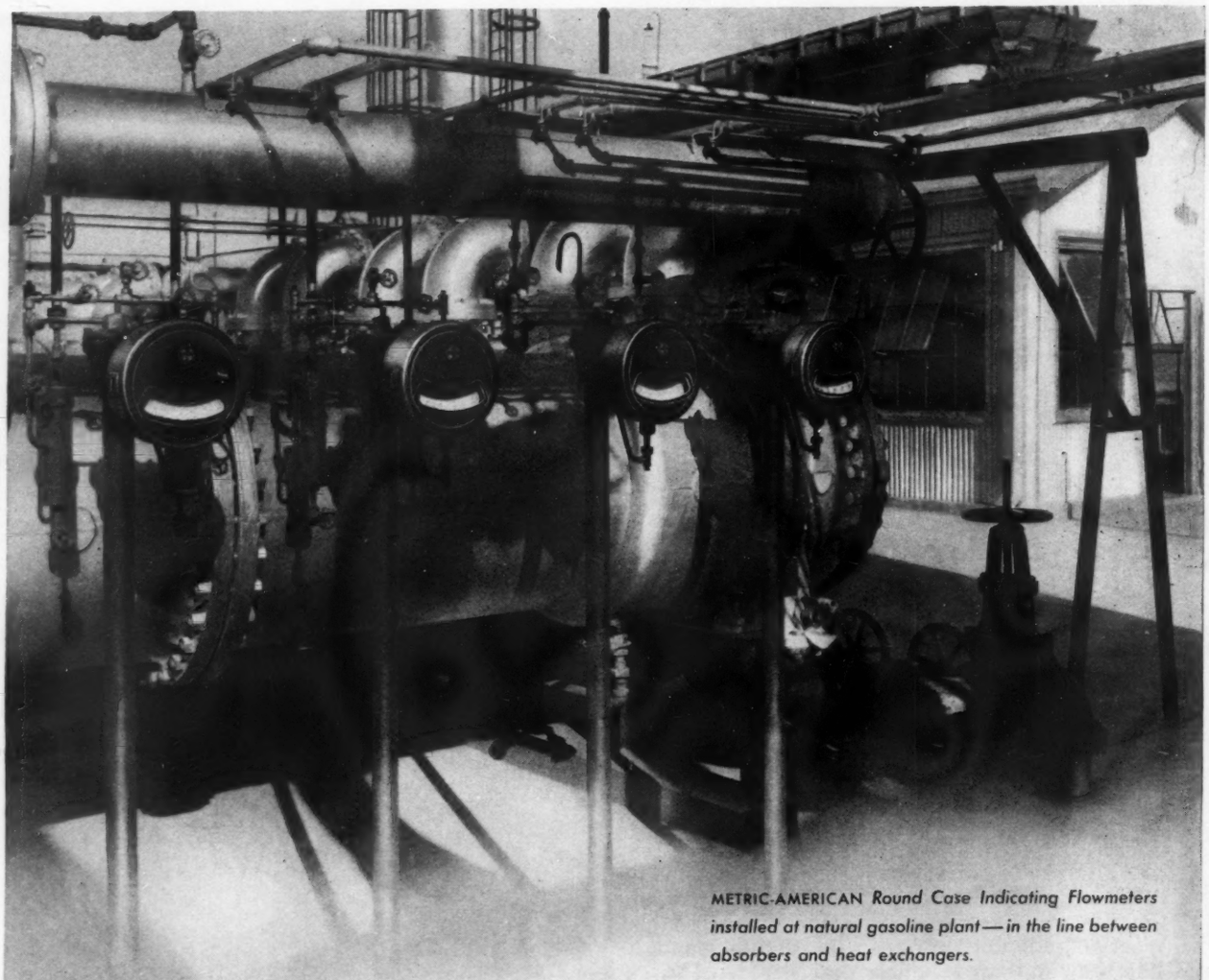
There is no intent here to minimize the importance of competition, and no intent to decry the valuable exchange of ideas as to how opposition may be met. But let's forget what isn't so.

Competition is important as a warning, just as physical pain serves as a warning of maladjustment of the bodily organism. Let us have ideas! Let us have cures! Let us have a whole pharmacopoeia of competitive specifics, but before applying them, let us have diagnosis. By diagnosis is meant simply a good, old-fashioned getting down to fundamentals; a realistic, objective scrutiny of ourselves, our problems and our needs.

Assume that we are physician, not patient. What has made us ill? Have we been overcome by an unexpected infection, or have we a chronic illness, induced by habitual violation of a simple rule of business health? What shall we prescribe for ourselves? Shall we apply a remedy solely because we have heard that it was used to treat a patient whose malady exhibited symptoms similar to those of the disease with which we suppose ourselves to be suffering? Is it to be expected that every disease which involves raised temperature will respond to the treatment for one particular fever? Is the remedy we propose truly a remedy, striking at the root of our trouble, or is it simply a palliative, easing the immediate pain?

Perhaps the trouble is simple; perhaps it is complex. Yet regardless of how complex it may be, let us try to consider it in as simple a manner as possible. Let us attempt to dissociate ourselves from preconceived ideas as to our sales problems and methods. Let us question every assumption and practice which has become traditional with us. Let us work with the realities of our own situation, applying to our sales problems the simplest of marketing tests. Why do people buy, or fail to buy, our wares? Do we offer the best possible service? Are our prices right? Is our presentation alert and vigorous, honest and sincere?

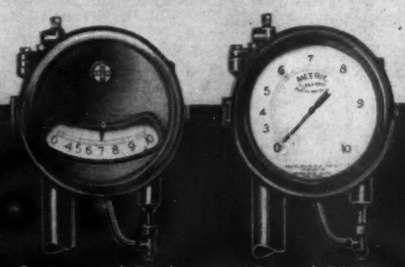
Certainly our problems are often trying. But they will be easier to solve if we can see them from a simple, fresh viewpoint. Our job of meeting competition will be an easier job if we will disregard the things that are not so and deal intelligently with facts unencumbered by bugaboos which won't stand up under scrutiny.



METRIC-AMERICAN *Round Case Indicating Flowmeters installed at natural gasoline plant—in the line between absorbers and heat exchangers.*

The flowmeter goes modern...

Advanced design . . . greater simplicity . . . maintained fine accuracy . . . • A thoroughly modernized instrument which has promptly become a favorite in the industry! Every part is accessible for cleaning and adjustment. Float lever can be adjusted without disturbing the other working parts. By simply removing top, a low pressure test can be run and float action observed. • The Round Case Flowmeter consists of a modified U-gage with mercury seal, and a sturdy, attractively-designed case to enclose indicator and dial. A steel float, actuated by the rise of the mercury, is attached by lever to a horizontal bearing shaft which extends through an adjustable lapped stainless steel stuffing-box into the case. The differential gage is constructed of forged steel throughout. • Complete data furnished on the applications and operation of METRIC-AMERICAN Indicating Flowmeters. Or Recording and Integrating Flowmeters. 867



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PACIFIC METER WORKS • LOS ANGELES • SAN FRANCISCO

November, 1937

GAS

Vol. XIII, No. 11

THIRTEENTH YEAR OF PUBLICATION

LOS ANGELES
810 South Spring Street

CHICAGO
1064 Peoples Gas Bldg.

HOUSTON
306 Shell Bldg.

GAS Presents This Month

OUR under-cover man, Craig Espy, who has now returned from peeking around corners in the Hotels Statler and Cleveland at the recent Convention, sends us the following notes:

"Proud moments: Mrs. Herman Russell to see Mr. Russell in the seat of honor; Mrs. George Wehrle to see George Wehrle receive the Munroe Award; Major Forward to hear a glowing report of this year's Association activities; Jay Barnes to learn that New Orleans gets the 1938 Natural Gas Conference; President Russell when his Rochester G. & E. Chorus got such a splendid ovation.

"Kept us busy following around A. "Flash" Gordon King of A.G.A. whose camera and flash bulb caught not a few of the delegates.

"Among the few who had pictures in the Cleveland 'Plaindealer'—Norman McKee, R. M. Conner, Clifford Johnstone. . . . Every time we see Chester May, we are reminded of the Jimmie Martin 'hot milk' episode. . . . Commercial Section Secretary, John West, was absent, being ill in the hospital. . . . Wouldn't seem like a natural gas meeting without Frank Chase in one of the front rows. . . . Was Colonel Walsh at the Convention? Didn't see him . . . . Personally missed C. K. Patton, Dallas; Gene Whitcomb, Fort Worth; and many others. . . . W. P. Hutchinson, Merrill Davis, and Joe Messenger seem to know and be known by everyone. . . . Fay Walters off to hear Dr. Scott Ewing's paper.

"Quotations within the quotation: "This will be a big year for the Natural Gas Department," said Holley Poe, "Bob Hendee's got a lot of ideas and I've got to do the work."

"Don't take a picture of me with these golf clubs," said one delegate, "my boss thinks I'm at the Home Service Breakfast."

To turn attention from Cleveland to this issue of GAS: Our "Guest Editor" this month is retiring Commercial Section Chairman F. M. Banks, and he opens the issue with his ideas on competition in the Gas Industry.

A thorough-going study of transmission line capacity by Benjamin Miller of Cities Service Co. of New York is the lead article, and much valuable information is therein contained. Of course there's a story (on Page 27) about the Convention.

Some of the activities, technical and otherwise, of the industry during the past year are reviewed in the digest section (Pages 32 to 40). (1) Lawrence Biemiller describes a carefully developed installation for gas water heating by immersion tubes installed directly in the storage tank. (2) New homes mean a new market for the industry. John F. Quinlan, A.G.A.'s Home Planning headman, tells about the current program. (3) Certain processes which formerly used electricity exclusively have been successfully turned to gas—for example, the one described by George M. Parker: gas radiant tubes as applied to a continuous enameling furnace. (4) Messrs. Schnidman and Yeaw of Rochester present the results of a series of tests, carried on under nearly field conditions, on the resistance of flue materials to corrosion from flue gas condensate. (5) Furnaces for the production of fine steel can be fired and atmospherically better controlled by gas than by any other fuel because gas is a metallurgical chemical as well as a source of heat. A furnace formerly using coal is described by Adam M. Steever. (6) Submerged combustion has graduated from a scientific curiosity to a valuable industrial process, and the burning of gas in the bottom of a tank of liquid, with combustion products bubbling up, is interestingly described by C. H. Lekberg. (7) L. S. Reagan of Webster Engineering outlines new principles for increasing efficiencies in gas firing of boilers and steam generators.

Several prominent speakers appeared before the National Bottled Gas Association Meeting held in Cleveland during the Convention, and we take pleasure in digesting two of the papers presented in the Butane-Propane News Department of this issue. Turn to Page 75.

While writing in October about November, we are starting to think about what's coming up in December. To let you in on it, it's an especially large issue in which will be preprinted the papers to be presented before the Fall Conference of the Pacific Coast Gas Association in San Francisco.

Across water as well as land the gas industry spins its web of pipe lines—lowering river lines from a barge.

DETERMINING GAS

By BENJAMIN MILLER

Cities Service Company

TWENTY-FIVE years ago Thomas R. Weymouth[1] made a most important contribution to the natural gas industry by publishing a gas flow formula which has since been used in the design and operation of a large part of the natural gas transmission system of the country. So generally has this formula been used that many in the industry believe that it is a theoretical formula. Indeed, in some publications "the theoretical formula" is mentioned, meaning the Weymouth formula; articles in which actual capacities of pipe lines are compared with computed capacities are particularly likely to give this impression.

It has been suggested that those who referred to the Weymouth formula as a theoretical formula did so because they used the expression theoretical formula to mean a standard with which to compare actual results, whereas I am using it to mean a formula which is the product of rational analysis only. I hasten to add that no one has yet succeeded in deriving a formula for the flow of natural gas in transmission lines by rational analysis alone, and at the present time the underlying factors are still being investigated. Careful reading of the various authorities on pipe line flow would show that the Weymouth formula is not a theoretical one, and Weymouth and Towl[2] called it empirical. If by empirical we are to understand "based on experience," the Weymouth formula is not empirical.

An empirical formula is one which is based on observation and experience; it is really only a sort of shorthand representation of all of the facts available. There are well defined processes for building empirical formulas from observations, and usually many different trials are required to find the correct formula. Weymouth did not have available the results of numerous carefully made tests on natural gas lines, as is shown by the section of his paper which is copied below. The tests he did have available were not completely described, and the results were, he said, quite probably inaccurate in respect of the quantity, so that he might well have despaired of using them to build a formula. But to him the law was evident; the well-merited confidence which the industry has had in his formula is a remarkable tribute to Weymouth's intuition.

Ordinarily a formula is expected to hold only within a certain range. In the case of a theoretical formula, the conditions must be consistent with the underlying assumptions. In the case of an empirical formula the conditions should be not too far removed from the conditions which existed in the experiments on which it is based, and the extrapolation of an empirical formula to a distant region is usually hazardous. Yet the Weymouth formula has been extrapolated far beyond the range which Weymouth discussed, and the extrapolation has not caused gross errors. This also differentiates the Weymouth formula from most empirical formulas.

The thoughtful engineer before using any formula wants to be sure that it is suitable for the particular conditions he has in mind. I have not been able to find anywhere in the literature a definite statement as to the limitations of the Weymouth formula, although suggestions that it has limitations are to be found in many places. Hancock[3] refers to the "intended scope" of the Weymouth formula, but gives no clue as to what he considers to be the intended scope, and Weymouth in his original article did not mention any limitations. Diehl[4] says that the Weymouth formula probably represents the average maximum capacity of new lines built under 1927 conditions, but points out that tests have indicated that the capacities of some lines are 10 per cent greater than those derived from the formula. Wills[5], after noting the general acceptance of the Weymouth formula, goes on to say that the friction factor used by Weymouth is too low when the pipe diameter exceeds 22 in. and especially when gas velocities are high. Johnson and Berwald[6] found in their flow tests of commercial pipe lines that for the large diameter lines the metered rates of delivery agreed more closely with the rates calculated from Weymouth's formula than with those calculated from any of the other formulas, and furthermore, that in the majority of tests made under favorable test conditions the metered volume was larger than the volume calculated from Weymouth's formula. On the other hand, Berwald and Johnson[7] point out that the application of Weymouth's formula to pipe lines smaller than 6 in. in diameter may give considerable error.

I propose to show under what conditions Weymouth's formula may be used, and what modifications must be made for other conditions, and also to suggest another formula which has a wider range than Weymouth's. Before doing so, however, I should like to point out again the remarkable nature of Weymouth's prediction. There

TRANSMISSION LINE CAPACITY

were formulas in existence before 1912, of course, and they took many forms, but all of them can be traced back to one invented by Chezy in 1775, which he based on observations of the flow of water in an earthen canal. The Chezy formula may be written

$$R = 1/2\ f\ A\ E\ S^2 \qquad (1)$$

in which

R is the resistance to flow,
A is the area of the solid-fluid interface,
E is the density of the fluid,
S is the speed of the fluid,
f is the coefficient of friction, a constant to be derived by experiment.

If the fluid is a perfect gas—that is, if its specific volume is proportional to the absolute temperature and inversely proportional to the pressure—and it is flowing through a straight horizontal pipe of circular cross-section, Equation (1) may be written

$$Q = 1.6156 \frac{T_0}{P_0}\left[\frac{(P_1^2 - P_2^2)\, d^5}{G\ T\ L\ f}\right]^{1/2} \qquad (2)$$

in which

Q = flow rate in cu.ft. per hour measured at T_0 and P_0.
T_0 = base temperature for measurement in °F. absolute.
P_0 = base pressure for measurement in lb./in.² absolute.
P_1 = inlet pressure in lb./in.² absolute.
P_2 = outlet pressure in lb./in.² absolute.
d = internal diameter of pipe in inches.
G = specific gravity of the gas, referred to air as unity.
T = temperature of flowing gas in °F. absolute.
L = length of pipe in miles.
f = coefficient of friction.

Equation (2) may be considered the type formula for gas flow; it is possible to write it in other forms, but it was used in this form by Weymouth[1]; in his paper it was Equation (10). After presenting this equation Weymouth went on:

"Experiments on the flow of air in pipes of different diameters indicate that the coefficient of friction f is a variable, decreasing with increasing diameters of line. A great many such experiments have been collected and published in *Compressed Air*, by Elmo G. Harris, from which, by the use of equation (10) the coefficients of friction have been computed and plotted in Fig. 2.

"In the reports of these tests no statements were made as to the method of measuring the quantity of gas flowing, and it is quite probable that many of the results are inaccurate in this respect. Notwithstanding this, however, the nature of the variation of f with the diameter is evident, and the curve represented by the equation

$$f = \frac{0.008}{\sqrt[3]{d}}$$

gives a fair average of the loci of the points plotted."

With this value of f Equation (2) becomes

$$Q = 18.062 \frac{T_0}{P_0}\left[\frac{(P_1^2 - P_2^2) d^{16/3}}{G\ T\ L}\right]^{1/2} \qquad (3)$$

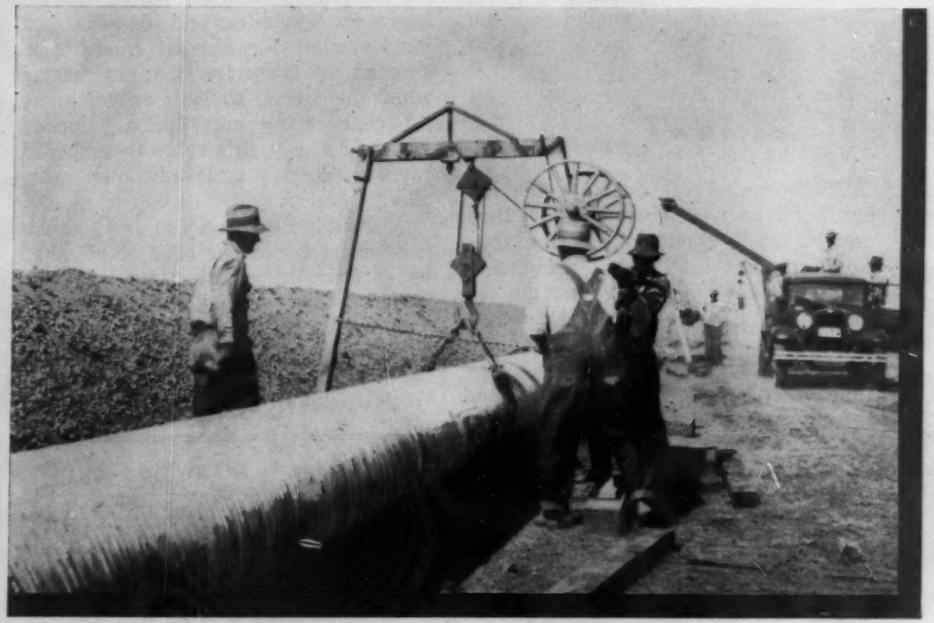
which is the Weymouth formula.

An examination of Fig. 1 (Weymouth's Fig. 2), shows that the points lie fairly close to the line up to about 4 in. diameter, but the points for 5-, 6-, 8-, and 12-in. pipe could not possibly lead to the type of variation of friction factor with diameter which Weymouth predicted if any of the common methods of deriving an empirical formula were used. Here is a formula based on tests of pipe varying from about 1 in. to about 12 in. in diameter. But examination shows that it does not agree very well with the tests of pipe between 5 in. and 12 in. in diameter, so that if it had been derived in the usual way it would seem to have been derived from the tests of pipe from 1 in. to 4. in. in diameter. Now comes the paradox. This formula is later found to be of great value for predicting flow in pipes 8 in. and over in diameter, but its application to pipes smaller than 6 in. in diameter may give considerable error. Surely no one looking at Weymouth's curve could expect that tests made 15 years later would be interpreted as showing that its extrapolation to 22 in. diameter is of value, though the portion of it closest to the points is valueless.

Weymouth's intuitive formulation of the variation of the friction factor with the diameter was fortunate for the industry, since it led to far more optimistic estimates of the carrying capacity of large pipe lines than any of the other formulas which had been called to the attention of the pipe line designers.

At the time Weymouth's formula was first published it was not gen-

Each year sees the construction of new and the extension of existing natural gas transmission lines—lowering a section of 24-inch pipe.



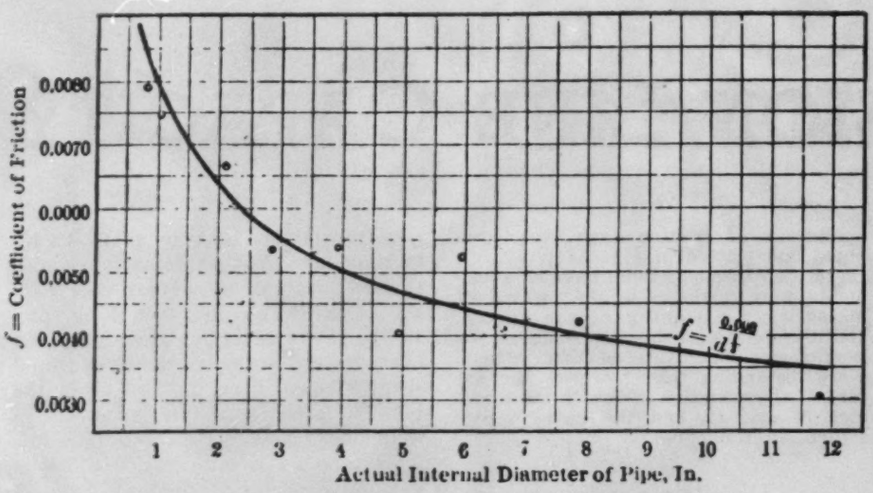


FIG. 1. Weymouth's curve showing coefficient of friction of flow of air in pipes.

erally known that the friction factor could not be a function of the diameter alone. It is true that Reynolds[8] had shown about 30 years earlier that the speed, density, and viscosity of the fluid were as important as the diameter in determining the friction factor, but the work of Reynolds did not seem to make any impression on engineering practice until it was recalled by later writers. In 1913 Blasius[9] in Germany rediscovered the Reynolds law, in 1914 Stanton and Pannell[10] in England established it by experiments so numerous and precise as to remove all doubts, and in 1915 Buckingham[11] gave a rigid theoretical derivation of it in the same journal in which Weymouth's formula had appeared.

The law which Reynolds discovered is usually written

$$f = \text{function of } \left(\frac{D\,E\,S}{V}\right) \qquad (4)$$

in which

D = diameter in ft.
E = density in lb./ft.³
S = speed in ft./sec.
V = viscosity in lb./sec.ft.

The meaning of the Reynolds law has been so well presented by Durand[12] that I cannot do better than copy from his statement: "This means that f depends on these four quantities and furthermore that it depends on them in such a way that for any one value of the expression D E S/V there is one and only one definite and specific value of f, regardless of the individual values of D, E, S, and V so long as the expression D E S/V has the given value.

"This point is of such great importance that emphasis through illustration will be desirable. Thus, suppose some particular combination of values of D, E, S, and V gives a value of D E S/V = 6000. Then corresponding to this value 6000 as argument will correspond a value of f = say .009. Then no matter what other combination of individual values D, E, S, and V we may have, as long as the value of D E S/V = 6000, so long shall we have the value f = .009. Stated otherwise, the value of f = .009 is applicable to all possible combinations of individual values of D, E, S, and V, as long as their combination in the form D E S/V = 6000.

"It is therefore only necessary to know the value of the defining characteristics E and V in order to assimilate together in one expression the laws of flow for liquids, gases, and vapors, and thus generally for all flowing substances.

"Thus again and broadly, no matter what the substance, so long as we know its viscosity and density; no matter what the size of conduit, so long as we know its size; no matter what the speed, so long as we know its measure, we may find a value of D E S/V and to this value then should correspond one and only one value of f."

Although Equation (4) is theoretically correct and has been established by experiment, at the time Durand's statement was published Equation (4) was not of practical value to the gas pipe line designer. Some of the reasons for this have probably occurred to the reader. The density and speed are varying in a gas line, the density being greatest and the speed least where the pressure is highest. But if we take the product E S, which is lb./ft.³ times ft./sec., we get lb./ft.² sec., and if the diameter is constant and the flow is steady the number of pounds of gas flowing through each square foot of cross section of pipe per second is the same at all parts of the line. Another difficulty is that usually what we are trying to determine is how much gas will flow, and that is one of the things that must be put into Equation (4) to determine D E S/V. This would make it necessary to guess at the answer and then see if the guess were a good one. However, as I have shown recently in another place[13], the Reynolds law can also be written in terms of the specific gravity, pressure conditions, diameter, length, flowing temperature, and viscosity:

$$f = \text{function of } \left[\frac{G\,(P_1^2 - P_2^2)\,d^5}{L\,T\,V^2}\right] \qquad (5)$$

and since all of these except the viscosity are involved in Equation (2) the only additional information required is the viscosity. The most important difficulty, however, was that the value of f corresponding to every value of D E S/V was not known. Trustworthy experiments had been carried out, but they extended in 1922 only to a value of D E S/V of 450,000, whereas the value of D E S/V may be twenty times as great in large pipe lines operating at full capacity. The relation between f and D E S/V could have been extrapolated, but such extrapolation could not be relied upon; it would be too much to expect all extrapolations to come out as fortunately as the extrapolation of Weymouth's formula. But between 1923 and 1930 there became available experiments extending to values of D E S/V of more than 3,000,000, and furthermore there were mathematical developments in the theory of flow which made it seem quite probable that the form of the function in Equation (5) was such that extrapolation to much higher values would be safe. I cannot go into the details of these developments at this time, but the result of the most recent work is

$$\left(\frac{1}{f}\right)^{1/2} = 2\left[\log\frac{G\,(P_1^2 - P_2^2)\,d^5}{L\,T\,V^2} - 3.66\right] \qquad (6)$$

When this is combined with Equation (2) there is obtained finally

$$Q = 3.23\frac{T_0}{P_0}\left[\frac{(P_1^2 - P_2^2)\,d^5}{G\,T\,L}\right]^{1/2}\left[\log\frac{G\,(P_1^2 - P_2^2)\,d^5}{L\,T\,V^2} - 3.66\right] \qquad (7)$$

which is the new formula that was mentioned above. On the basis of

the information now available Equation (7) should give results that are accurate within one per cent, provided the conditions are consistent with the assumptions made. The assumptions are:

1. The gas is perfect.
2. The flow is steady.
3. The temperature is constant.
4. The pipe is straight, round, and level.
5. The pressure drop is due only to pipe friction.

If the conditions are not consistent with the assumptions, corrections must be made. Before going into these, however, I must keep my promise to show under what conditions Weymouth's formula may be used, and how to correct the flow rate computed by Weymouth's formula for other conditions. I start by rewriting Weymouth's formula, and shall hereafter denote by Q_w the flow rate it predicts:

$$Q_w = 3.23 \frac{T_0}{P_0}\left[\frac{(P_1^2-P_2^2)\,d^5}{G_a T_a L}\right]^{1/2}\left[\frac{d^{1/6}}{.032}\right]^{1/2} \quad (8)$$

Dividing Equation (7) by Equation (8)

$$\frac{Q}{Q_w} = \frac{\left[\log \frac{G\,(P_1^2-P_2^2)\,d^3}{L\,T\,V^2} - 3.66\right]}{\left[\frac{d^{1/6}}{.032}\right]^{1/2}} \quad (9)$$

Equation (9) is an expression for the ratio of the flow rate computed by the new formula to the flow rate computed by Weymouth's formula. Inspection will show that there must be some values for which the ratio will be equal to one; under these conditions the formulas will indicate the same flow rate. To get a more explicit definition of these conditions, rewrite Equation (8):

$$Q_w = 3.23 \frac{T_0}{P_0}\left[\frac{G\,(P_1^2-P_2^2)\,d^3}{L\,T\,V^2}\right]^{1/2}\left[\frac{d\,V}{G}\right]\left[\frac{d^{1/6}}{.032}\right]^{1/2} \quad (10)$$

$$\left[\frac{G\,(P_1^2-P_2^2)\,d^3}{L\,T\,V^2}\right] = \left[\frac{Q_w\,P_0\,G}{3.23\,T_0\,d\,V}\right]^2\left[\frac{.032}{d^{1/6}}\right] \quad (11)$$

Substituting in Equation (9) from Equation (11)

$$\frac{Q}{Q_w} = \frac{2\log Q_w + 2\log\frac{P_0\,G}{3.23\,T_0\,d\,V} + \log\frac{.032}{d^{1/6}} - 3.66}{\left[\frac{d^{1/6}}{.032}\right]^{1/2}} \quad (12)$$

Equation (12) shows how the ratio of Q to Q_w varies with the several factors that enter into the pipe line flow problem. As an example of the use of Equation (12), consider the first test reported by Johnson and Berwald. This was on a line 21.380 in. I.D.; the specific gravity of the gas was 0.593; the base pressure 14.4; the base temperature 520; the

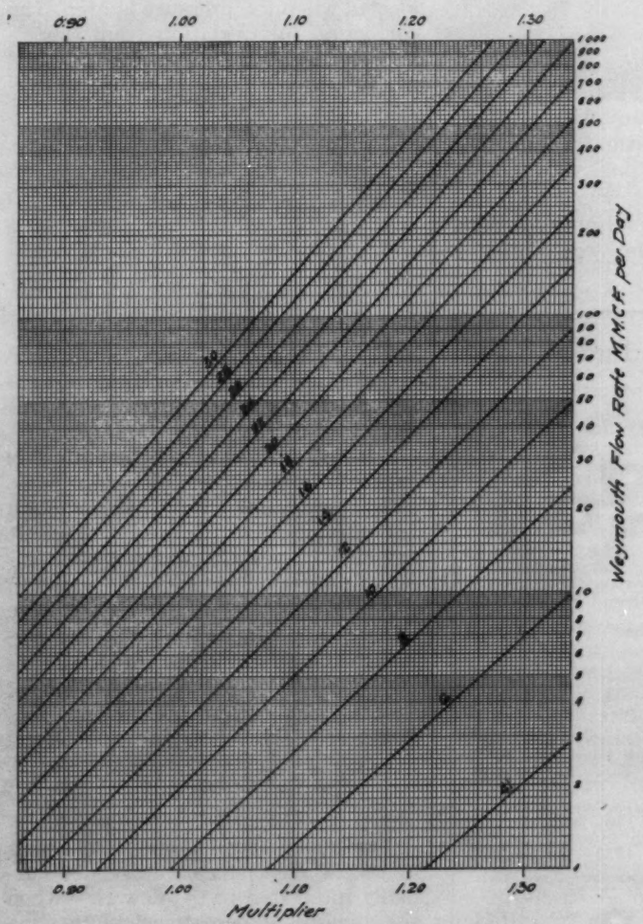


FIG. 2. Weymouth flow rate calculations.

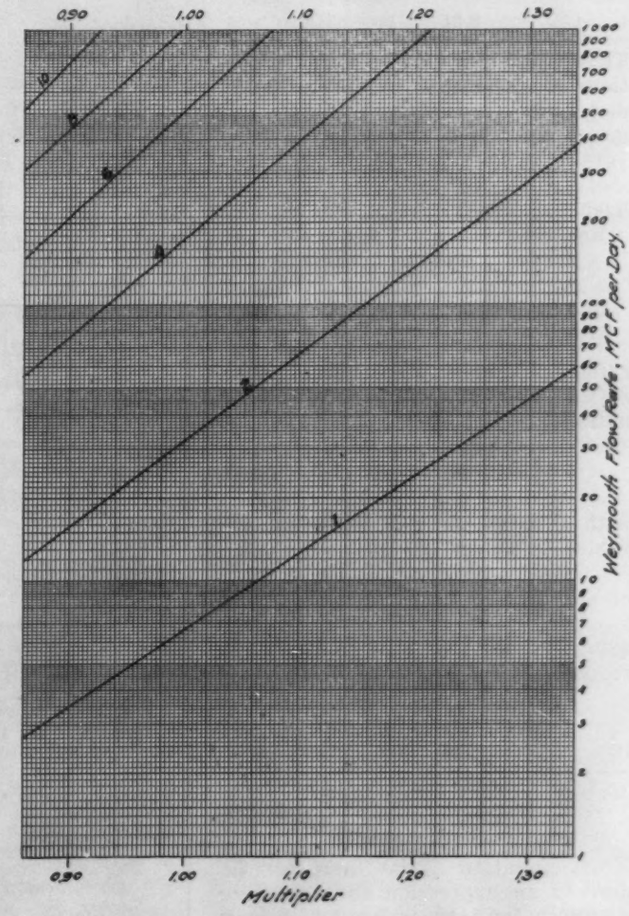


FIG. 3. Weymouth flow rate calculations.

gas viscosity 7.46×10^{-6}; and Q_w was 1,345,000. Following through, the calculation gives $\frac{Q}{Q_w} = 1.038$.

The result of the calculation for this case is that the new formula would predict a flow rate 3.8 per cent higher than Weymouth's formula. There appears to be considerable labor involved in making this computation, but examination will show that for a particular line handling a particular gas everything is constant except the flow rate computed by Weymouth's formula, so that the ratio can be calculated for other flow rates quite simply. In the case just considered Equation (12) reduced to

$$\frac{Q}{Q_w} = \frac{2 \log Q_w - 2.59}{9.31} \qquad (12A)$$

and Equation (12A) can be used to show what correction factors must be applied to Weymouth's formula as the flow rate changes. For example, suppose the pressure conditions were such that Weymouth's formula would predict a flow rate of 500,000. Then $\log Q_w = 5.6990$, and

$$\frac{Q}{Q_w} = \frac{11.3980 - 2.59}{9.31} = \frac{8.81}{9.31} = .947$$

That is, under very light load conditions Weymouth's formula would predict flow rates that are too high. But under peak load conditions the flow rate predicted by Weymouth's formula would be too low. If Q_w is 8,000,000, which might be the case for a line this size

$$\frac{Q}{Q_w} = \frac{13.8062 - 2.59}{9.31} = \frac{11.22}{9.31} = 1.205$$

For a definite diameter of line carrying a definite gas an equation such as 12A can be set up. So far as natural gas is concerned, the value of $\frac{G}{V}$ will be between 8×10^4 and 14×10^4, with 10×10^4 being a representative value. If we use 10×10^4 as the value of $\frac{G}{V}$, 14.4 as the value of P_o, and 520 as the value of T_o, Equation (12) reduces to

$$\frac{Q}{Q_w} = \frac{2 \log Q_w + 0.71 - \frac{7}{3} \log d}{\left[\frac{d^{1\frac{1}{2}}}{.032}\right]^{\frac{1}{2}}} \qquad (12B)$$

From Equation (12B) there can be derived an expression for each line diameter, an expression which will give the multiplier to be applied to the flow rate calculated by Weymouth's formula in order to get the flow rate which would be calculated by the new formula. I have derived these expressions for several diameters up to 30 in., and have plotted them on the accompanying charts. (Fig. 2 and Fig. 3.) I have used the Weymouth flow for a day as the argument, since flow rates are usually put on a daily basis. To use the charts it is simply necessary to pick the intersection of a flow rate line with a diameter line and then read the multiplier. Since the chart diameter lines are in even inches and the internal diameters are usually not, it may be necessary to interpolate. For example, if a line having an internal diameter of 12.2 in. is so operated that it would carry 30 MM C F. per day according to Weymouth's formula, the multiplier is 1.222, and the flow rate according to the new formula is 36.66 MM C F. per day. (Fig. 1) There is no need to carry so many figures, nor can they be justified, since the properties of the gas may not be the same as were assumed in writing Equation (12B); a more reasonable statement would be that the flow rate computed by the new formula would be between 36 and 37 MM C F. per day.

The primary purpose of these charts is to show at a glance the range of flow rates for any size pipe in which the Weymouth formula will give reasonably accurate results. They may also serve those who have tabulated or charted solutions to Weymouth's formula, and would like to transfer these to solutions of the new formula. It is possible to use them together with Weymouth's formula, but I strongly advise the use of Equation (7) instead. If the gas viscosity is not known, a value of 7×10^{-6} may be used without great error, but if high accuracy is required the gas viscosity should be determined. With the Rankine viscometer this is a simple matter, much simpler in fact than the determination of the gravity.

It was mentioned above that certain assumptions were made in deriving the flow formula; I must now confess that the conditions may be such that these assumptions are entirely unwarranted. However, some deviations can be allowed for, and the effect of others can be determined by experience.

The first assumption is that the gas is perfect. Actually natural gas expands somewhat more with increase of temperature than would a perfect gas. Fortunately the temperature in the gas line is not greatly different from the standard temperature usually chosen, so that the error introduced by the assumption of Charles's law can be neglected. The deviation from Boyle's law, however, can not be neglected when the pressure is high. The correction for deviation from Boyle's law may be made by multiplying Q by the factor

$$\left[1 + a\left(P_1 + P_2 - \frac{2P_1P_2}{P_1 + P_2}\right)\right]^{\frac{1}{2}}$$

in which a is defined by the relationship

$$E_P = E_0 \frac{P(1 + aP)}{P_0} \qquad (13)$$

E_p being the density at pressure P and E_o being the density at pressure P_o, P being preferably taken as $\frac{P_1 + P_2}{2}$. While this correction is only approximate, it is close enough for all practical purposes, since it amounts only to a few per cent except in extreme cases. For instance, if a is 0.000162, and if we should have $P_1 = 800$ and $P_2 = 600$, then the correction factor would be

$$\left[1 + 0.000162\left(800 + 600 - \frac{2 \times 800 \times 600}{1400}\right)\right]^{\frac{1}{2}} = 1.056$$

The steady flow assumption seems to be justified, since we are not normally interested in the flow rate when the amount of gas stored in the line

(Continued on Page 72)

Calendar

November

American Petroleum Institute — Stevens Hotel, Chicago, Ill., Nov. 9-12.

Seventeenth Annual Gas School Conference, Midwest Gas Association—Iowa State College, Ames, Iowa, Nov. 10-13.

Natural Bureau of Standards—Conference on Corrosion and Protection of Pipe Lines, National Bureau of Standards, Washington, D. C., Nov. 15-17.

Mid-Continent Oil and Gas Association—Annual Membership Meeting, Kansas-Oklahoma Division, Tulsa, Okla., November 19.

December

Pacific Coast Gas Association—Fall Conference, Fairmont Hotel, San Francisco, Calif., December 15-16.

January, 1938

Compressed Gas Manufacturers' Association—Annual Meeting and 25th Anniversary, Waldorf-Astoria Hotel, New York City, January 17-18.

National Bottled Gas Association—Waldorf-Astoria Hotel, New York City, January 19.

February, 1938

New England Gas Association—Hotel Statler, Boston, Mass., Feb. 24-25.

Southern Gas Association—Dallas, Texas, February 16-18.

A. G. A.'s 19th CONVENTION

Full Program of Wide Interest Acclaimed by 2569 Delegates; Atlantic City Chosen for 1938

Above: A. G. A. President-elect N. C. McGOWEN of United Gas Public Service Co. addresses the Convention. Left: President W. T. RASCH (left) of the Association of Gas Appliance & Equipment Manufacturers (American Gas Products Corp.) chats with President-elect MERRILL N. DAVIS (S. R. Dresser Manufacturing Co.).

GAS STAFF REPORT

IN Cleveland, Ohio, last September there suddenly appeared a great band of men, who—invading the Cleveland and Statler hotels—rapidly identified themselves as delegates to the American Gas Association's Nineteenth Annual Convention. Their number grew until it officially totalled 2569, and it must have been just about that number which assembled on the morning of Tuesday, September 28, at the Convention's first general session to hear President Herman Russell fire the starting gun to a most interesting round of meetings.

Atlantic City has been again chosen as the 1938 meeting place of the Association, the meeting to take place in October. No exhibits will be held at this convention.

The Natural Gas Department meeting will be held in New Orleans the last of April or early in May.

The general and sectional meetings which were held from September 27 to October 1 were so well attended that the official registered attendance figures hardly seemed to justify the great number of gas men present. Comparative figures show that the 1937 delegation surpassed by more than 1000 the attendance at the convention in Chicago two years ago, although falling short of the 5400 mark set at Atlantic City last year.

The program activities were so divided as to give the first day entirely over to the Natural Gas Department program. This meeting was held at the Hotel Cleveland and was presided over by Chairman George E. Welker. Seven hundred and sixty-six attended the first session, representing an all time high for the Department's meetings which have been held in conjunction with the Association.

The addresses of A. A. Nichoson of the Texas Corp., New York, who spoke on "2,000 Years of Progressive Evolution of the Worker," and that of William A. Dougherty of Gas Companies, Inc., New York, on "Legislation and Taxation" were considered especially timely in view of national events and accordingly drew preferred attention from the delegates.

Chairman Welker's opening remarks in addition to welcoming the natural gas men to Cleveland, touched upon "Constructive Conservation" and "Service," as being the keynotes of the industry's business. The "competitive situation" which has caused the industry to become gas sales minded, the "development and improvement of better gas burning appliances" for domestic, commercial and industrial purposes, the "personnel training problems" and many other topics were touched in Mr. Welker's address.

He also recommended the suggested plan of alternating gas appliance exhibits between the Spring meeting of the Natural Gas Department and the Fall Convention of the American Gas Association and a continuation of the organization by committees for studying current operating problems under the topics of production, transmission and compression, and utilization and sales promotion, the three main divisions of interest.

Mr. Herman Russell, president of the Association, Major Alexander Forward, managing director, F. M. Banks, Southern California Gas Co., and William T. Rasch, American Gas Products Corp., also appeared on the program, the close of which saw the election of R. W. Hendee of Colorado Interstate Gas Co. as incoming Chairman. Thomas R. Weymouth, Columbia Gas & Electric Corp., was elected as vice-chairman.

General Sessions

The general sessions of the convention got into full swing Tuesday morning with the address of welcome of the Mayor of Cleveland. President Russell was wielding the gavel. The general sessions were held at Hotel Statler. Those appearing on the program were Joseph F. Rooney, treasurer of the Association, Frank H. Adams, Surface Combustion Corp., Walter C. Beckjord, Columbia Gas & Electric Corp., and N. C. McGowen, United Gas Public Service Co.

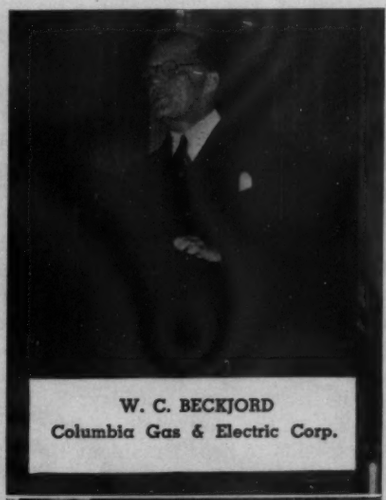
GAS CAMERA

. . . The Delegates—at Work—and at Play During the A. G. A.'s Cleveland Convention

Typical registration office scene at the Cleveland Hotel: Managing the cards, Miss MARY SPEAR in charge of A.G.A. membership; at the cash register, Mrs. C. KRAUSE, of A.G.A. Laboratories; registering, MARY ALICE CROSSON, West Texas Gas Co., Lubbock; awaiting his turn, C. C. YOUNG, Gas Service Co., Kansas City.

At Left: Mountain Fuel Supply Co. executives: J. D. ROBERTS (left), vice-president and general manager, Salt Lake City and F. B. FIRMAN, secretary, Findlay, Ohio.

Below: At the Laboratories: HENRY OBERMEYER, assistant to the executive vice-president, Consolidated Edison Co. of N.Y.; F. R. WRIGHT, A.G.A. Laboratories; ELMER SCHMIDT, vice-president, and JULIAN FOSTER, general superintendent of Lone Star Gas Co., Dallas, Texas.



W. C. BECKJORD
Columbia Gas & Electric Corp.

GEORGE E. WELKER
Natural Gas Dept. Chairman

DEAN STRICKLAND
United Gas System

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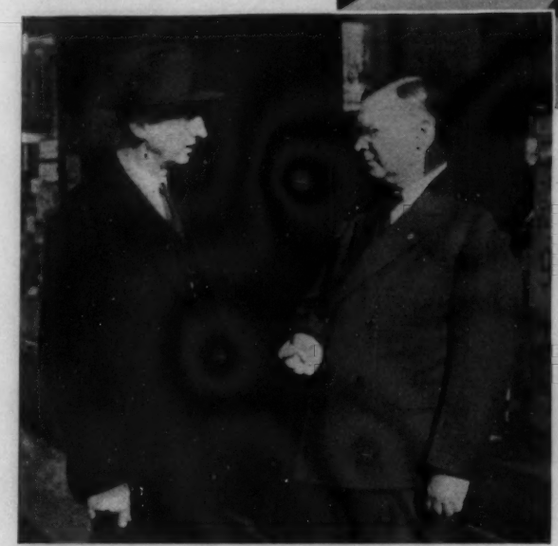
AT THE AMERICAN GAS Association's Executive Board Meeting at the Hotel Cleveland: (Seated left to right): L. B. DENNING, Lone Star Gas Co.; D. D. BARNUM, Boston Consolidated Gas Co.; T. J. STRICKLER, Kansas City Gas Co.; B. J. MULLANEY, The Peoples Gas Light & Coke Co.; W. E. STEINWEDELL, The Gas Machinery Co.; K. R. BOYES, American Gas Association; HERMAN RUSSELL, A.G.A. President, Rochester Gas & Electric Corp.; ALEXANDER FORWARD, A.G.A. Managing Director; FRANK L. CHASE, Lone Star Gas Co.; F. A. NEWTON, The Commonwealth & Southern Corp.; C. W. BENNETT, Detroit City Gas Co.; W. C. BECKJORD, Columbia Gas & Electric Corp.; J. F. ROONEY, Consolidated Edison Co. of N. Y., Inc.; NORMAN R. McKEE, Southern Counties Gas Co.; GEORGE E. WELKER, United Natural Gas Co.; C. E. GALLAGHER, The East Ohio Gas Co.
(Standing left to right): H. C. COOPER, Hope Natural Gas Co.; W. T. RASCH, American Gas Products Corp.; C. W. HUNTER, Consolidated Edison Co. of N. Y., Inc.; H. E. CLIFF, Public Service Electric & Gas Co.; N. T. SELLMAN, Consolidated Edison Co. of N. Y., Inc.; JAMES F. POLLARD, Seattle Gas Co.; H. H. CUTHRELL, Brooklyn Union Gas Co.



A sidewalk conversation: CLIFFORD JOHNSTONE, managing director, Pacific Coast Gas Association and E. HOLLEY POE, secretary, Natural Gas Department.

Brief repast: R. C. BON SEIGNEUR, regional sales manager, Servel, Inc., Omaha, Nebraska, discusses a point with H. S. BENNETT, district manager, Manufacturers Light & Heat Co., Wheeling, West Virginia and with W. L. HUTCHESON, merchandise sales manager, Manufacturers Light and Heat Co., Pittsburgh.

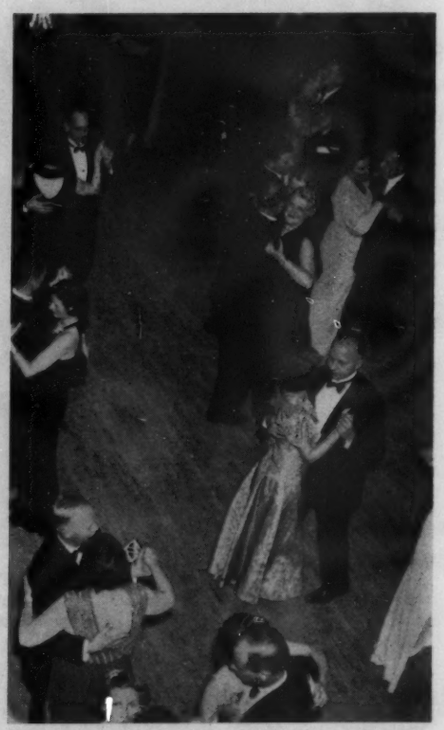
O. R. ALLGEIER, The St. Louis County Gas Co., Webster Grove, Mo. J. P. DERRINGER, Surface Combustion Co., St. Louis, Mo.; ROY COHN, Crane Co., Chicago, Ill.; W. L. JONES, The St. Louis County Gas Co., Webster Grove, Mo.; W. P. JOHNSON, United Gas Fuel, Hamilton, Ontario; A. W. HUMM, Williams & Saylor, New York; C. V. SORENSON, Public Service Co. of Indiana, Indianapolis.

GAS Camera Welcomes Informal Photos of Men Well Known to the Gas Industry

SOUTHERN UNION DELEGATES

In force at the Cleveland Convention were representatives of the Southern Union Gas Co. System. Front row: (left to right) F. D. BRADLEY, purchasing agent, Southern Union System; J. H. WILSON, district manager, New Mexico Gas Co.; C. H. ZACHRY, vice-president-treasurer, Southern Union System; A. C. BLACK, vice-president, Kingfisher County Gas Co.; H. BEAUCHAMP, Jr., district manager, West Texas District. Back row: H. C. FRIZZELL, district manager, South Texas District; VAN THOMPSON, district manager, The Gas Co. of New Mexico; J. R. COLE, vice-president, New Mexico Gas Co.; L. L. BAXTER, vice-president, Arkansas Western Gas Co.; H. N. OLDHAM, district manager, Pecos Valley Gas Co.

Seated and at ease are WILLIAM REYNOLDS (left), advertising manager, Servel, Inc., and O. J. HAAGEN, general sales manager, Ohio Fuel Gas Co., Columbus.



AT THE DANCE

Delegates enjoyed the President's Dance on Tuesday evening.

FAY C. WALTERS, superintendent of measurement, Panhandle Eastern Pipe Line Co., Kansas City, Mo. and C. B. WILSON, new business manager, Little Rock (Ark.) Gas & Fuel Co.

H. C. COOPER, president and general manager, Hope Natural Gas Co., Pittsburgh, Pa.

At the banquet table: W. ALTON JONES, executive vice-president, Cities Service Co., N. Y., and T. J. STRICKLER, vice-president and general manager, Kansas City Gas Co., Kansas City, Mo.

Photograph by Dana Chase

N. C. McGowen was elected president of the Association at this meeting. Conrad N. Lauer, president, Philadelphia Gas Works Co., Philadelphia, was elected first vice-president and Walter C. Beckjord, vice-president, Columbia Gas & Electric Corp., second vice-president. J. F. Rooney, assistant to the executive vice-president, Consolidated Edison Co., was named treasurer.

The following were selected as directors for two-year terms: F. H. Adams, vice-president, Surface Combustion Corp., Toledo, Ohio; Charles M. Cohn, vice-president, Consolidated Gas Electric Light & Power Co., Baltimore, Md.; J. S. DeHart, Jr., president, Isbell-Porter Co., Newark, N. J.; L. B. Denning, president, Lone Star Gas Co., Dallas, Texas; C. E. Gallagher, president, The East Ohio Gas Co., Cleveland, Ohio; George S. Hawley, president, Bridgeport Gas Light Co., Bridgeport, Conn.; B. J. Mullaney, vice-president, The Peoples Gas Light & Coke Co., Chicago, Ill.; Otto Snyder, president, New York Power & Light Co., Albany, N. Y.; and T. J. Strickler, vice-president, Kansas City Gas Co., Kansas City, Mo.

President Herman Russell's male chorus of Rochester Gas & Electric Corp. was a principal attraction at the second general session meeting, convening Wednesday night. The president's address was a feature of this meeting with Mr. Russell being presented by N. C. McGowen.

The highest honor within the gift of the American Gas Association was conferred at this meeting upon George Wehrle, superintendent of the gas department of Public Service Co. of Colorado with the presentation to him of the Charles A. Munroe Award for having made the most outstanding contribution of an individual toward the advancement of the gas industry.

The basis for the award dates back to 1928 when Mr. Wehrle planned and directed the change-over of the Denver system from manufactured to natural gas and also takes into consideration the solving of subsequent problems arising on the system during intervening years. It was the Munroe Award committee's decision that a very large measure of originality, ingenuity and pioneering were necessary in devising and perfecting this change-over which has since become widely considered as a pattern for conversions later made by other companies. The Award consists of a $500 financial acknowledgement and an engrossed certificate.

The Beal Medal, likewise awarded at this meeting, went to Elmer Frederic Schuldt, assistant superintendent, Central district, The Peoples Gas Light & Coke Co., Chicago. This award is given for the best technical paper presented before association meetings during the year. Mr. Schuldt's paper on "The Precision Method of Locating Gas Leaks," was presented before the Distribution Conference of the Technical Section held at Washington last April, and was the basis of the award. The paper appeared in abstract form in the October issue of *G A S*.

Above: A. G. A. President HERMAN RUSSELL (left) presents the Charles A. Munroe Award to GEORGE WEHRLE of Public Service Co. of Colorado. At left: ELMER F. SCHULDT of Peoples Gas Light and Coke Co. (right) receives the Beal Medal from ERNEST R. ACKER, president, Central Hudson Gas & Electric Corp.

The last general session program was held Thursday morning, the closing day of the conference. Mr. Russell presided, features of the program being talks by Charles C. Parlin, T. H. A. Tiedemann, Dwight J. Baum and the Mystery Chef broadcast.

Interspersed with the general assemblies were the various departmental meetings and luncheon conferences.

The Accounting Section met Tuesday, Wednesday and Thursday afternoons, the second afternoon providing a series of luncheons. At one, customer accounting formed the basis for discussion; at another, general accounting; the third, credits and collections; and fourth, customer relations. Following the luncheon meetings visits were made to the Accounting Section exhibit of office labor saving devices.

The first meeting of this group, presided over by H. E. Cliff, Public Service Electric & Gas Co., as chairman, presented G. B. Webber, J. Gordon Ross, F. L. Griffith, H. L. Gruehn and P. J. Sweenie. G. F. Trexler, J. J. Natale, Dr. W. J. McConnell, W. E. Scott, E. F. Embree, F. C. Reel, G. I. Simpson and H. C. Davidson, were presented at the Thursday afternoon meeting.

D. H. Mitchell, vice-president and general manager, Northern Indiana Public Service Co., Hammond, Ind., was elected as incoming chairman and H. A. Ehrmann of Consolidated Edison Co. of New York was named as vice-chairman.

The Commercial Section gathered with Chairman F. M. Banks of Southern California Gas Co. on Tuesday, Wednesday and Thursday afternoons. The programmed speakers were Mr. Banks, Charles E. Bennett, Hall M. Henry, Dean A. Strickland, John F. Quinlan, Gerald E. Stedman, B. A. Seiple, C. A. Nash, Elizabeth Sweeney, H. E. Dexter, W. E. McCreery, N. T. Sellman, H. O. Loebell, Hugh Cuthrell and Kenneth Goode.

A number of the speakers took part in a special panel discussion, a feature of the second program, covering the subjects of time payments, home service, meter sales plans, sink water heaters, and refrigeration campaigning.

(Continued on Page 80)

Developing a Large Volume Immersion Gas Water Heater

● **LAWRENCE E. BIEMILLER, Consolidated Gas Electric & Power Co. of Baltimore, Md.; addressing the Industrial Gas Section, Nineteenth Annual Convention of the American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937. Mr. Beimiller was chairman of the Volume Water Heating Committee and herewith published are excerpts from Section E, "The Immersion Gas Water Heater," of the Committee Report.—(Abstract by G A S).**

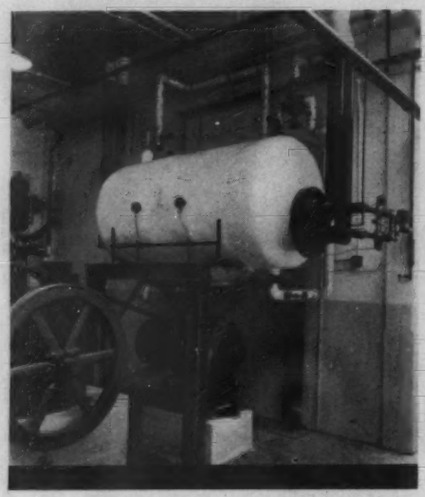


FIG. 1. Immersion heated hot water storage tank.

FOR some time there has been interest in several parts of the country in the possibility of developing large volume immersion gas water heaters. Extensive work was done on this in Baltimore,* and much information was put at the disposal of the Volume Water Heating Committee from this source.

A heater was developed as shown in Fig. 1. This has two "U" shaped coils of black steel pipe with welded bends. Both inlet and outlet of coil are welded into a removable head, so that the coil can be removed for repair, replacement, or cleaning. The inside of the storage tank can be cleaned through the same opening. Nozzle type atmospheric gas burners are used, and when carefully adjusted for the correct heat input will result in CO less than .01 per cent air free basis in the flue products.

A detailed test was run, as hereafter described, on a unit with 1,000 gallon storage capacity, and 520,000 B.t.u. input to burners. The equipment is specified in detail as follows:

Tank capacity: approximately 60 in. diameter; 84 in. long having a capacity of 1,000 gallons.

Gas burners: four No. IH250 Buzzer Immersion burners, each burning 130,000 B.t.u. per hour.

Gas valves: two 1 in. V-15-5 Minneapolis Honeywell motorized gas valves, each supplying two burners.

Coil: four 5 in. extra heavy black steel pipe coils with mitred cut and welded ends measuring 7 ft. 6 in. from header to end of coil.

Flue: vertical flue from center of outlet coil to base of draft hood on two upper coils—48 in., on two lower coils 56 in.

Safety pilots: four No. 20600-15 Baltimore automatic shut-off switches. Each burner has its own safety pilot. Switches are wired in series with thermostats controlling motorized gas valve.

Temperature control equipment: two No. L-416-4 Minneapolis Honeywell immersion aquastats. Each thermostat controls two burners.

Tank insulation: 2 in.-85 per cent Magnesia covering hard finished with insulation cement.

Water usage measured by Trident Recording Cold Water Meter in supply tank. Hot water temperature measured at tank outlet by calibrated recording thermometer. Average hot water temperature obtained by weighting average temperature for each hour by hot water used during that period. Cold water temperatures measured by calibrated indicating thermometer. Gas was measured by calibrated gas meter, with no correction for temperature or pressure, since this was noted as less than the accuracy of meter.

Results are shown graphically in Fig. 2 and summarized in Table No. 1.

1. This test on an immersion gas

TABLE No. 1.

Time Period	*Gals. Water*	*Gal. Per Hr.*	*H.W. Temp.*	*Cold Water Temp.*	*Gas* Used Cu. Ft.*	*Efficiency %*
Sat. —12:01 A.M. to 5:00 P.M.	5,440	320	143	48	10,900	79.0
Sat. — 5:00 P.M. to Mon.—6:00 A.M.	2,660	72	157	48	6,670	72.5
Mon.— 6:00 A.M. to Tues.—5:00 A.M.	7,440	325	142	48	14,020	83.1
Sat. —12:01 A.M. to Tues.—5:00 A.M.	15,540	202	145	48	31,590	79.5

* 500 B.t.u. per cu.ft.

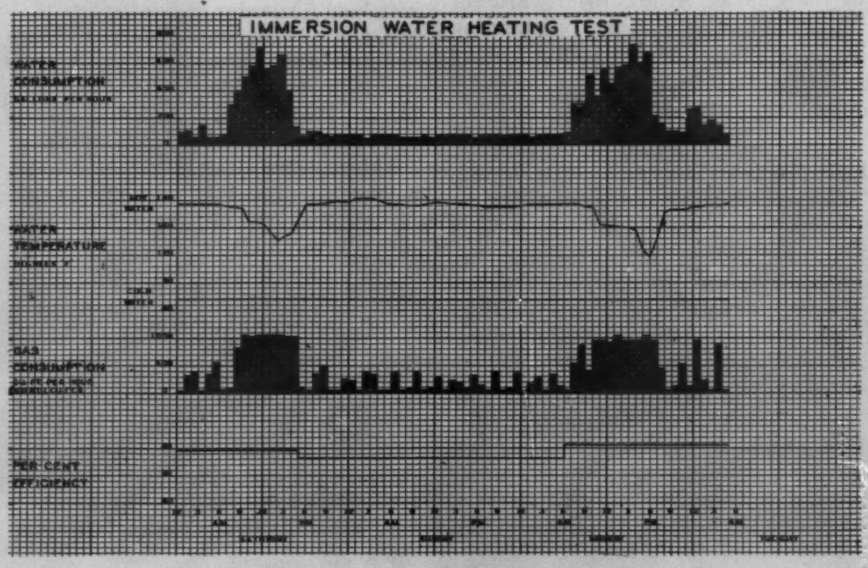


FIG. 2. Immersion water heating test.

* Acknowledgment is here made of the committee's indebtedness to Fulton D. Macneal, of Consolidated Gas Electric Light and Power Company of Baltimore, who conducted the tests of immersion water heaters given in this report, and who contributed to the development of the gas immersion water heater herein discussed.

water heater shows that such a heater has a thermal efficiency of about 81 per cent, at an average load of 70 per cent capacity over a 36-hour period. Its efficiency drops to only 72½ per cent at a load of 18 per cent capacity over a 37-hour weekend period.

2. The burner and thermostatic pilot must be exactly located so that they function satisfactorily.

3. One unit in operation for about one year showed some corrosion of the inner surface of the tubes. The committee has begun an investigation into corrosion resistant tube materials.

4. Due to immersion coils being in the bottom of the horizontal tank, more constant water temperature at the faucet results until the capacity of the system has been drawn.

5. A very large percentage of the storage capacity of the tank can be used before the outlet water temperature drops excessively. In a test of a 250 gal. tank of 154° water, the temperature dropped to 150° on drawing 56 per cent of tank capacity, and to only 130° on drawing 76 per cent of tank capacity.

6. The immersion water heater can be installed in space not usable for other systems. They may be installed on the floor, since there are no problems of circulation between heating unit and storage tank. They may be installed over existing machinery or equipment. One heater now in service in a steel mill is installed over an air compressor; another is installed in a washroom over a battery of toilet stalls.

7. Secondary air control is not justified, as there is little circulation through the tubes when the burners are off. An actual test showed no measurable increase in efficiency due to secondary air control.

8. The first cost compares favorably with other systems. In Baltimore, when using the same mark-ups, the cost of a system with 550 gal. storage and 500,000 B.t.u. input was found to be within 5 per cent of that of a system of the same size consisting of storage tank and sectional cast-iron steam boiler. The immersion system is usable with high water pressures not permissible with direct systems using cast-iron boilers.

9. Multi-burner units may be controlled by two or more thermostats set for different temperatures.

10. Controls may be electric, or all gas.

11. The immersion water heater is easy to insulate so as to give minimum stand-by loss.

12. Difficulties with circulation between storage tank and heating unit are eliminated.

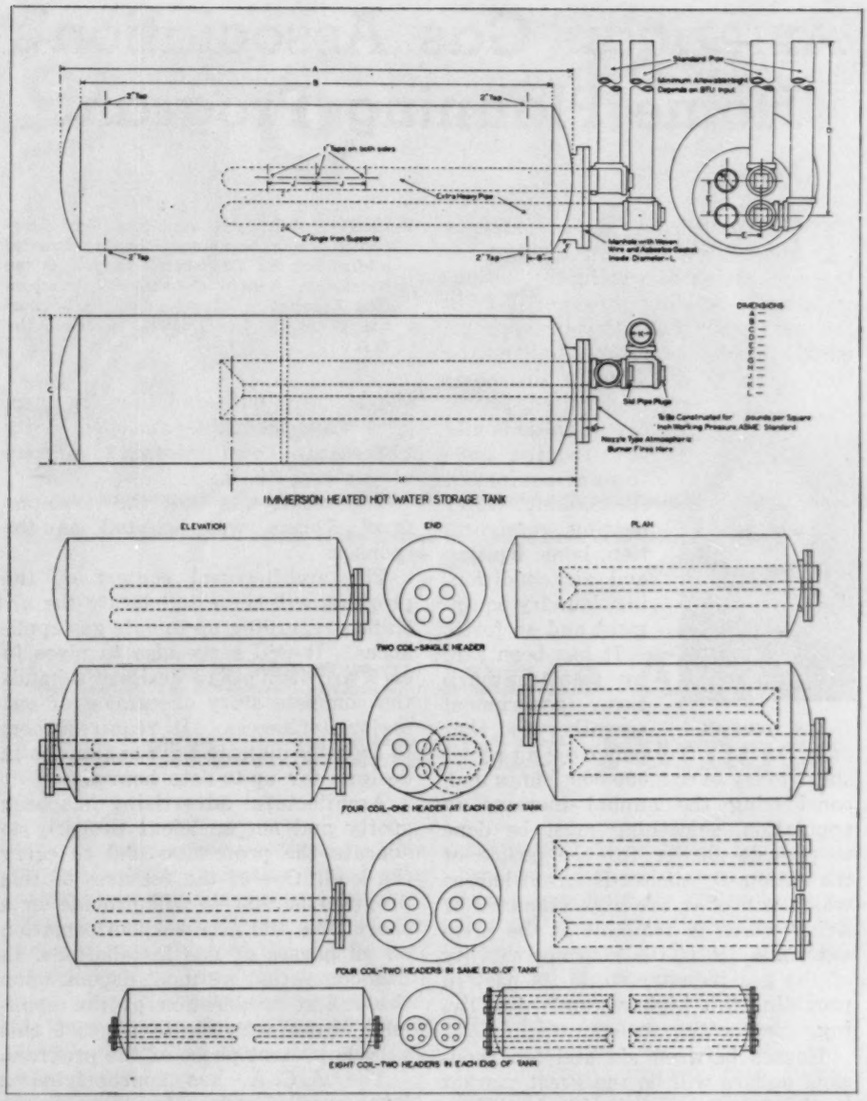

IMMERSION HEATED HOT WATER STORAGE TANK
ELEVATION
END
PLAN
TWO COIL-SINGLE HEADER
FOUR COIL-ONE HEADER AT EACH END OF TANK
FOUR COIL-TWO HEADERS IN SAME END OF TANK
EIGHT COIL-TWO HEADERS IN EACH END OF TANK

FIG. 3. Immersion heated hot water tanks (showing typical arrangement of coil units).

13. Coils are readily cleaned, repaired, or replaced.

14. Gas immersion coils can be readily placed in tanks also equipped with steam coils, and thereby offer an ideal method of securing the summer water heating load where winter water heating is by steam from a heating boiler.

Recommendation

The Volume Water Heating Committee of the Industrial Gas Section believes everything possible should be done by the industry to encourage the development and marketing of large volume immersion gas water heaters. It, therefore, recommended to the Committee on Industrial Gas Research that it do any necessary work to develop exact designs for "Gas Immersion Burners for Volume Water Heaters," to consist of 4, 5, and 6 in. coils, respectively, with atmospheric burners which are thermostatically controlled and protected by thermostatic pilots. It recommends that water heater manufacturers be encouraged to manufacture and market such burners. It is assumed that such burners would in most cases be manufactured at a few points and shipped all over the country for use in tanks fabricated by local tank manufacturers near the place where the water heater is to be installed. The committee proposes that multiple units of such burners could be used with any desired tank size to give any desired combination of storage and generating capacity. This is indicated on the accompanying sketch, Fig. 3.

American Gas Association's Home Planning Program

● JOHN F. QUINLAN, American Gas Association Home Appliance Planning Bureau; addressing the Commercial Section at the Nineteenth Annual Convention, American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937.—(Abstract by GAS).

THE American Gas Industry is about to launch a campaign for the application of gas in the nationwide home-building program. Within the next year there will be approximately 300,000 new homes built in the United States and literally thousands modernized. Every one of these homes will require some form of equipment for cooking, water heating, refrigeration, home heating and air conditioning, laundry equipment and so forth.

J. F. QUINLAN

It has been said by many authorities, government and otherwise, that our country is short today over 2,000,000 homes and, considering the annual increase in population, something must be done to provide shelter for the people of the nation. By shelter is meant houses which will offer the high standard of living which is available at the present time. It is the rich opportunity of the gas industry to do its part in providing this higher standard of living.

Houses between six and ten thousand dollars will be the great market in the future. Hundreds of millions of dollars have been expended by the Government during the past few years in the effort to stimulate interest in housing. Yet the market has been merely scratched.

In addition to new housing, there are millions of homes at the present time which are out of date but may become up-to-date through the use of gas appliances. The replacement market, therefore, as well as the new house market is of tremendous importance to the industry. To obtain this business is the major purpose of our Home Appliance Planning Bureau.

First contact should be with the architectural profession in the form of a nationwide architectural contest with attractive cash prizes for winning designs, and so forth. For this purpose, and in order to obtain the best program which could be devised, we called in separately the editors of the four major architectural papers —gave each magazine one month to prepare a program which it felt we should carry out—and then, in turn, gave each magazine an opportunity to present its own program to a group of our executives.

The result was that the *Architectural Forum* was selected as the sponsor.

The architectural contest of the program will serve to educate the architect regarding up-to-date gas appliances. It will serve also to place in each architect's and designer's hands the complete story or catalog of our major appliances. It requires them to actually indicate such appliances in designs for up-to-date homes.

Architectural advertising has been spotty and not sufficient properly to educate the profession and to carry the load. One of the features of this program is that it will provide in a short time the necessary information on all phases of gas installations. In this connection we must depend upon the fullest cooperation of the appliance manufacturers to support this very important phase of the program.

The A. G. A. has appropriated a large sum of money to carry on the work of the program during the next fiscal year and this advertising feature is one of the very few tasks asked of the appliance manufacturers. This can be done at very small cost to each manufacturer. It was considered advisable to apply the cost in this way rather than to ask for a lump sum from the manufacturers.

The 4 Stages of the Program

1. Home Owner contest for photographs of gas equipped kitchens, gas equipped basements and all gas homes.
2. Architectural contest stressing the theme—Use Gas For All 4—Cooking, Hot Water, Heating and Conditioning, Refrigeration.
3. Builder contest.
4. The 1939 New York World's Fair.

Builders will be required under the rules of the program to maintain completely gas equipped homes for local demonstration. This will provide an opportunity for hundreds of thousands of people to see the latest and best service and equipment which the industry offers. Also, it is the plan to organize the country through the medium of all operating companies and others interested with a view to establishing hundreds of additional homes for demonstration purposes. Appropriate literature will be sent to all member companies by January 1st outlining the procedure for organizing this additional feature.

It will be suggested that local committees be formed in all important cities where there are gas properties —each committee to be composed of the leading local factors interested in the construction and furnishing of homes. A representative of the local gas company should be selected in each instance to head up such a committee, and he will be responsible for approaching local builders and their architects in a plan to have these homes constructed, equipped and demonstrated.

Such homes will provide the best possible demonstration showrooms for operating companies and appliance manufacturers. Appropriate literature for organizing this addditional feature of the 1938 program will be available in due course.

It is important that some individual be appointed in each organization to carry out the details of the program as outlined. A local representative committee should be appointed and the personnel of this committee should report to A. G. A. headquarters with the name of its chairman. We, in turn, will correspond from then on with the chairman in each instance.

Suitable guides for local newspaper campaigns and appropriate articles for local publication covering all phases of gas installations will be sent free of charge. We should have a suitable tie-in also in our nationwide architectural and home builders contests. Both the utility and manufacturing companies should see to it that appropriate information is given locally to architects and builders. The present national advertising program will support the program from a nationwide standpoint, and the program will also be liberally supported by the leading home magazines editorially.

Let us assume the offensive—we have the necessary materials, ammunition and intelligent men to do so. This offensive will call for the active, full support of every man in our great army from coast to coast.

● **GEORGE M. PARKER, Mississippi River Fuel Corp., St. Louis, Mo.: addressing the American Gas Association Industrial Gas Section and the Midwest Industrial Gas Sales Council in Chicago, June 8-9, 1937. Subject: "Application of Gas Radiant Tubes to a Continuous Enameling Furnace."—(Abstract by G A S).**

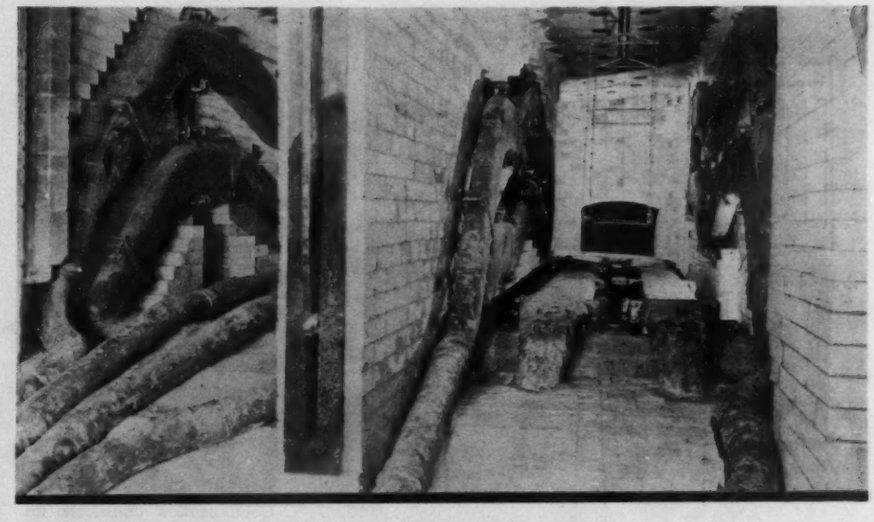


FIG. 1. Showing the interior of the furnace and the manner of installation of the radiant gas tubes.

Gas Radiant Tubes Applied To an Enameling Furnace

THE electrical industry has always claimed that there are certain heating operations that can be accompanied with more uniform and superior results in electrically-heated furnaces. Heretofore, there has been considerable basis for this assumption, but with the development of gas-fired radiant tubes the assumption no longer can be made, for radiant tubes not only will operate to produce results equal to those obtained in electrically-heated furnaces but will do the work with the additional advantages of lower cost and increased production.

G. M. PARKER

The changing of the large continuous enameling furnace at the National Enameling and Stamping Co. plant at Granite City, Ill., from a furnace heated by electric elements to a furnace heated with radiant gas-fired tubes was the first conversion of this kind to be made following the initial batch type experiments of the Committee on Industrial Gas Research. It marks the beginning of a new advance in the application of gas to industrial heating operations.

Hairpin Furnace

Not until the advent of the radiant gas tube did either the gas company or NESCO feel that a possible solution was in sight. The problem was not an easy one. The furnace, as built, was a hairpin furnace having 120 ft. of travel in the drying space, 20 ft. in the preheater and 40 ft. in the hot zone, a total of 180 ft. of oven travel. The electrical heating elements, located along the walls of the furnace that provided the heat in the preheater and hot zone, were removed and replaced by radiant gas tubes on both the walls and the bottom of the furnace. The tubes extend through 120 ft. of furnace travel. The products of combustion continue to give off heat in the preheater and drying zones to an exit temperature of 400°. This means that 80 per cent of the gross heat content of the gas burned is delivered to the furnace as useful heat. The temperatures maintained in the hot zone range from 1550° to 1650°, depending upon the kind of ware being burned.

The changeover to the gas radiant tubes was completed and the furnace was lighted on June 15, 1936, and after approximately one year's operation, the saving in fuel cost with natural gas at 30c as against 1c per Kwh electric energy would be more than $20,000.00. The gas tubes at the present time appear to be in good shape and should continue to give service without major maintenance for several more years. After the first few months of operation small leaks appeared in some of the welds, probably due to unrelieved strains set up at the time the welds were made, but no further leaks have developed and it is believed that the condition is stabilized. The amount of leakage into the furnace is negligible and has not affected the quality of the ware. It is believed that welding troubles could be solved if the welds were made and annealed on the job, using small gas-fired annealing covers especially built to set the tubes in place. Since the proper operation of these tubes requires that they be under negative pressure, leakage of gas into the furnace seems unlikely, if the cross section of the tubes is sufficient and negative pressure is actually maintained within them.

Production Increased

Production through this furnace has increased 20 per cent over its capacity as an electrical furnace. The ware is better dried and there is a smaller temperature differential between the top and bottom of the furnace. This probably results from the fact that radiant gas tubes are installed in the bottom, where no electrical elements were in place. The thermal capacity of the radiant tubes on account of their mass seems to provide an added advantage. In changing from light to heavy ware the gas tubes recover much more rapidly than the electrical elements. The radiant tubes, as installed, are controllable within close limits and they react quickly to changing heat input. The increase in production is attributed to the higher heat input into the furnace now possible.

■ ■

Webb, West Texas Co., Dies

J. D. Webb, district superintendent of West Texas Gas Co. at Midland, Texas, was killed in a collision with a truck while driving near Wilson.

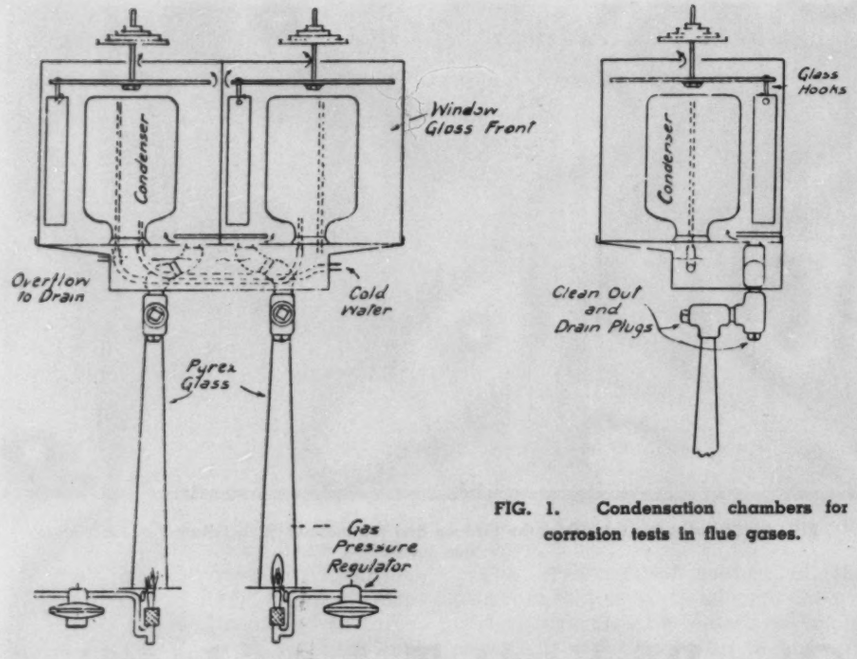


FIG. 1. Condensation chambers for corrosion tests in flue gases.

Flue Gas Corrosion of Metals and Alloys

● LOUIS SHNIDMAN and JESSE S. YEAW, Rochester Gas and Electric Corp., Rochester, N. Y.; addressing the Technical Section, Nineteenth Annual Convention of the American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937.—(Abstract by G A S).

THE flue products, resulting from the combustion of most industrial fuels, exhibit a surprising activity with respect to the corrosion of materials with which they come into contact from the time they leave the burner or fuel bed until they are finally discharged into the outer atmosphere. The presence of the oxides of sulfur has generally been justly blamed for much of the difficulty, but it has been clearly demonstrated that the elimination of sulfur from these gases does not eliminate corrosion. The complete removal of sulfur from fuels is neither feasible nor practicable at the present time. The substitution of corrosive resistant materials for the susceptible ones now used in the construction of equipment and flue conduits is one possible method of solving the corrosion problem.

The method of testing possible corrosion-resistant substances in the laboratory is a problem in itself. The value of the results depends to a considerable degree upon how closely the test procedure coincides with actual application.

While former methods may have yielded comparative results and valuable indications of the order of resistance of the samples tested, it was thought that possibly still more valuable data could be obtained, if the strips were exposed to a truly condensing medium composed of actual flue gases. No attempt was to be made to condense all of the moisture in the flue gas. Enough gas was to be burned so that plenty of vapor was always available.

TABLE No. 1. ANALYSIS OF COMBUSTIBLE GASES.

Constituent	Purified Gas % by Vol.	Foul Gas % by Vol.
CO_2	2.9	3.1
Ill.	3.5	3.6
O_2	0.4	0.4
CO	10.8	10.3
H_2	42.9	44.3
CH_4	27.2	26.3
N_2	12.3	12.0
B.t.u. (Det'd)	540	551
Sp. Gr.	0.512	0.519
Minor Constituents	*Grs./100 Cu. Ft.*	*Grs./100 Cu. Ft.*
Ammonia as NH_3	Approx. 5	Approx. 100
H_2S as sulfur	None	300
Organic sulfur as sulfur	9	13
Cyanogen as HCN	None	30-50
Avg. Anal. of Com. bustion Products in Corrosion Boxes		
Gas	*% by Vol.*	*% by Vol.*
CO_2	5- 6	6-8
O_2	9-10	4-7
CO	0- 0	0-5

The Corrosion Apparatus

A diagram of the corrosion apparatus is shown in Fig. 1. Two separate chambers were used; the flue products from a purified manufactured gas were passed into one, and the flue products of an unpurified mixture were passed into the other. These gases were passed through pressure regulators and burned with small Electrolux refrigerator burners, which were equipped with snap action valves that would automatically shut off the gas supply if the flame should be extinguished accidentally. The flames burned inside Pyrex glass tubes, and the excess air was controlled by a variable opening through which the burner heads were thrust. The hot flue products were conducted through a short, water-cooled, bent, tube and into the corrosion chamber under a baffle plate as shown. The products were then cooled to the condensing point in the corrosion chamber by the inverted bottles through which cold water was circulated.

In the ordinary flues and conduits, there is some motion of the flue products past the surrounding surfaces. This undoubtedly plays some part in the corrosion. Such motion was attained in the present test by moving the strips in the corrosive atmosphere. Each strip was suspended on a glass hook from a circular disk in the top of the corrosion chamber which was kept in slow motion by means of a motor reduction gear not shown in Fig. 1. The rate of rotation was five and one half turns per minute. This movement also kept the vapors in the boxes in constant motion, and the fumes were evenly distributed to all parts of the test strips. Excess gases escaped through the hole in the roof through which the shaft of the disc passed. The progress of the test was observed through the

TABLE No. 2. SAMPLES TESTED.

Test Piece No.	Type of Metal	Analysis Cr	Ni	Al	Cu	Zn	Fe	Si	Mn	Mg	Pb	Sn	P	S	C	Other
1.	Chromium Steel	16.08	.267				rest	.273	.37				.020	.014	.076	
2.	Chrom-Nickel Stainless Steel	19.17	9.05				rest	.310	.35				.027	.018	.10	
3.	Al-Cu Alloy, Al Coated			95.0	4.0				.5	.5						
4.	Aluminum-Magnesium Alloy	.25		97.25						2.5						
5.	Aluminum			99			(1% max.)									
6.	Silicon Bronze				96	1		3								
7.	85-15 Brass				84-87	15 approx.	.10 max.				.20 max.	.15 max.				
8.	Silicon-Manganese Bronze				96		.25 max.	2.75-3.25	.75-1.25							.50 max.
9.	Galvanized Iron															
10.	Commercial Copper															
11.	Black Iron															
12.	Commercial Lead															

front of the chamber which was closed by ordinary window glass. The degree of condensation was regulated by increasing or decreasing the gas combustion rates and the excess air supply. The adjustment was made so that a foglike mist filled the interior of the corrosion chamber which resulted in a copious precipitation on the test strips.

The average analyses for the combustible gases, used in test work, are shown in Table No. 1. A list of the metals is presented in Table No. 2 together with their respective analyses as given by the manufacturer.

Sample strips 7 in. long and 1½ in. wide were cut from the sheet metals and alloys submitted for this test work, and quarter-inch holes were stamped near one end so that the samples could be suspended on the glass hooks as illustrated in Fig. 1.

The samples were allowed to remain in the corrosive atmospheres four weeks, at the end of which time all of them were removed, washed and/or brushed to remove the corrosion products, dried in the warming oven, and weighed again to the nearest milligram. The difference in weights was considered to be the loss by corrosion during the four-week period. All of these data were calculated to a common basis in terms of loss by weight in grams per sq. in. per year, and the average depth in terms of inches of corrosion per year was derived from this value.

The more tenacious corrosion products were removed by brushing as lightly as possible with a stiff wire brush.

Results

The results in terms of an average penetration for each strip every month, calculated to the common basis of one year, are shown graphically in Fig. 2 and 3.

In general it was noted that the

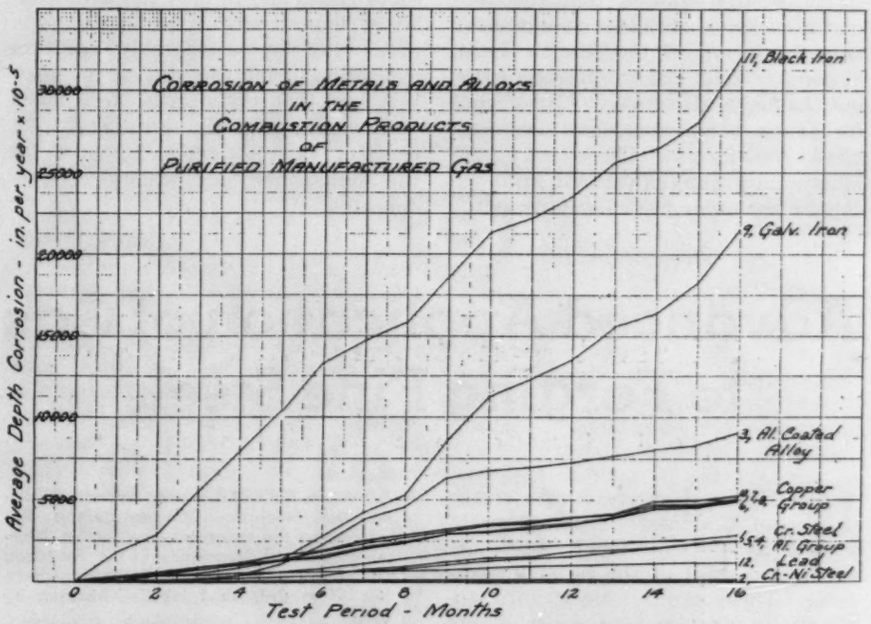

Corrosion of Metals and Alloys in the Combustion Products of Purified Manufactured Gas
Average Depth Corrosion - in. per year x 10-5
Test Period - Months
11, Black Iron
9, Galv. Iron
3, Al. Coated Alloy
Copper Group
Cr. Steel
Al. Group
Lead
Cr.-Ni Steel

FIG. 2. Corrosion of metals and alloys in the combustion products of purified manufactured gas.

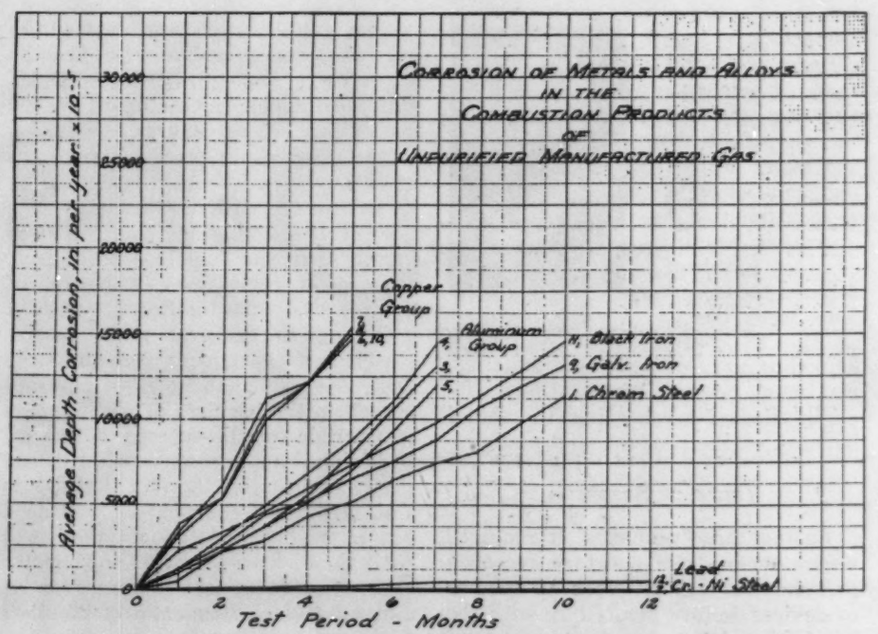

Corrosion of Metals and Alloys in the Combustion Products of Unpurified Manufactured Gas
Average Depth Corrosion, in. per year x 10-5
Test Period - Months
Copper Group
Aluminum Group
11, Black Iron
9, Galv. Iron
1, Chrom Steel
Lead
Cr.-Ni Steel

FIG. 3. Corrosion of metals and alloys in the combustion products of unpurified manufactured gas.

corrosion products formed in the purified gas products were of finer texture and adhered much more closely to the strip, than in the case of the foul gas products. This did not necessarily indicate that the depth of the corrosion would be different, as is well illustrated by the corrosion of the iron strips.

The original purpose for using the unpurified gas was to indicate maximum corrosion conditions. While the results may not entirely fulfill the original purpose, they are interesting and of value from other standpoints.

The results showed that the 18-8 chrom-nickel or stainless steel was far superior to any of the others. Lead, aluminum, zinc, and chrom steel without the nickel stand next. Copper and its alloys come next, and ordinary black iron was last. The attack on the aluminum group, galvanized iron, the copper group, and curiously upon the chrom steel was greatly accelerated in the unpurified gas flue products, but this was not the case for the lead and iron test strips. The relative rates of attack by the flue products of these two gases seemed low when it is considered that the unpurified gas contains 35-40 times the quantity of sulfur, at least 20 times the quantity of NH_3, and 30-50 grains of HCN which was not present in the purified gas.

A comparison of corrosion data, obtained by subjecting the test pieces directly to flue gas vapors, with data obtained by immersing the strips in condensates and in pure hot acid solutions, showed that relative corrosion rates may be considerably different depending upon the method of testing, and that the results were much more variable when synthetic solutions or vapors were substituted for the actual flue gas vapors or condensates.

Advanced Application of Gas to Forging Fine Steels

● **ADAM M. STEEVER, superintendent, Columbia Tool Steel Co., Chicago Heights, Ill.: addressing the Industrial Gas Section, Nineteenth Annual Convention of the American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937.—(Abstract by G A S).**

IN THE manufacture of fine steels, one of the most important problems, if not the most important, is the absolute control of the heating processes. These steels have a wide application for precision tools of all classes and depend upon subsequent heat treatments for their ultimate properties.

A. M. STEEVER

Before the advent of accurate heating control, the manufacturer had many perplexing problems which were attributed to improper heating of the product. Some of these problems were the inability to control decarburization, rate of heating, maximum heating temperatures, the elimination of overheating, the actual burning of the product, and scaling.

Years of Research

Facing these problems, it required several years of laboratory research and shop experiment, with all manner of devices, before proceeding with the conversion of a furnace to a completely controlled gas-fired unit.

This initial installation involved the conversion of furnaces with hearths up to 16 ft. in length, 7 ft. in depth, with loading capacities up to 30,000 lbs. of product per charge.

For many years previous, furnaces of this type had been fired with coal, in accordance with the general practice in the tool steel field. It was known that gas fuel had been used, at various times over a period of many years, with indifferent success.

During the several years of research and experiment preceding the first conversion, an entirely new approach to the problem of gas use was responsible for the success of this installation. This new approach involved the recognition of the fact that gas is a metallurgical chemical as well as a source of heat. Although gas, as a fuel alone, showed little superiority over other fuels, it is outstanding as a metallurgical chemical over all other fuels.

This superiority is due to the flexibility of control, chemically and otherwise, making it possible to provide the exact chemical condition and reaction needed for a specific process and to deliver the exact quantity of fuel at any desired point.

Control instruments were set up in recognition of these principles. They included recording temperature controllers, automatic gas and air regulating valves, a carbon dioxide recorder and accurate furnace pressure gages and gas pressure regulators.

Combustion Control Accuracy

Accuracy of combustion control has been made possible by two factors: the availability of a supply of natural gas of uniform heating value, and the combustion of this gas, at positive pressures, with a uniform and predetermined air supply. This practice results in the practical elimination of variables in the combustion equation.

The newest furnaces are box type and of the so-called portable design, involving a steel underframe resting on, but not fixed to, a heat resisting concrete slab which permits expansion and contraction and transmits a minimum of ground shocks to the furnace proper. This construction is expected to contribute substantially to longer furnace life and to reduce repairs to the refractories. They are also designed so they can be moved to new locations, should plant practice make this desirable. Having no stacks and being connected only to gas and air lines and to control instruments, which are easily moved, these furnaces are strictly portable. They are lined with the new increased alumina super-refractory fire brick, backed with light weight insulating brick.

In use, the heating program is an exact schedule determined by the job foreman. By means of a program slate the foreman indicates his instructions for the complete 24-hour program. The operating shift starts at 7:00 A. M. after the heating program has gradually brought the charge to temperature, allowing one hour soaking time between the hours of 6:00 and 7:00 A. M. A recording pyrometer shows whether or not these instructions have been followed by the heater; likewise, continuous gas analysis apparatus shows whether or not desired combustion has been maintained.

Further reduction in gas consumption has followed in furnace design from the utilization of insulation. Insulation has also contributed substantially to the comfort of hammer crews working near the furnace.

An air curtain is provided at each

furnace door for protection of the operators. This curtain also serves to cool the door and door frame castings. These furnaces also operate at a slight positive pressure, which is the result of the measures taken to control atmospheres. A propane standby has been installed which makes it possible to change over to substitute fuel at any time without any interruption or furnace adjustments whatsoever.

Incidental to this furnace practice, but important in the opinion of the management, is the fact that the controlled gas firing makes possible a floored, lighted, comfortable, clean shop, free from soot, scale and cinders. All furnaces and equipment, such as rolling mills, hammers, shears, etc., are kept in a clean aluminum painted condition, all of which is conducive to the new standards of workmanship required.

■ ■

Lordsburg, N. M., Starts On $50,000 Distribution Line

Construction of a $50,000 municipal natural gas distribution system for Lordsburg, N. M., was expected to start about November 1, according to Harvey J. Forward, representing Headman-Ferguson Engineers, Phoenix. Work must be completed before February 28.

The distribution system will consist of 6670 ft. of 4-in. pipe and 38,550 ft. of 2-in. pipe. The only transmission line required will be approximately 300 ft. of high-pressure 2-in. main.

The El Paso Natural Gas Co. will supply the gas. It is anticipated that there will eventually be about 450 consumers.

An intensive load-building campaign will be conducted by the city during the construction period. All merchandise will be sold and installed by local appliance dealers.

■ ■

Tex-Mex Co. Pipes Premont And Falfurrias For Gas

Tex-Mex Natural Gas Co., with headquarters in Houston, Texas, was to have completed piping the towns of Falfurrias and Premont for natural gas service about November 1, according to R. M. Hutchison, president. Thirteen miles of welded 2- and 3-in. line were laid to serve these new natural gas communities from the Premont field which is about four miles from Premont.

These towns are located in the Rio Grande Valley along the main highway to Brownsville. Premont will have about 100 meters and Falfurrias from 200 to 250 meters. Intermediate pressure will be served.

■ ■

Hubbs Made United Purchaser

John H. Hubbs has been appointed head of the purchasing department of United Gas Improvement Co., Philadelphia, Pa., to succeed R. Z. Zimmermann, formerly vice-president and purchasing agent, who has accepted a position as assistant in charge of operations of the Philadelphia Electric Co.

The Heating of Liquids by Submerged Combustion

● **C. H. LEKBERG, Northern Indiana Public Service Co., Hammond, Ind.; addressing the Industrial Gas Session, Nineteenth Annual Convention, American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937.—(Abstract by G A S).**

WITHIN recent years what appears to be a satisfactory submerged combustion system has been developed within the territory served by the Northern Indiana Public Service Co. This burner is now ready for the market. Seven years have been spent in the development of this burner and it has proved to be entirely practical.

The system consists of a control assembly so designed that the operator has only to press a starting button to put everything into operation. When shut down, the solution in the tank will have completely filled the burner manifold and combustion chamber. As the starting button is pressed, a specially designed gas and air compressor is started up, and as the compressed air is purging the burner of solution, the control system begins to operate. Automatically a hot wire igniter is heated to incandescence and a flow of pilot gas is admitted into the burner. After a predetermined time to establish a uniform gas air flow, the main gas flow is permitted to pass through the system. The burner might be classed as a nozzle mixing type. It is so designed that there is no possibility of back firing. The burner plate is located about four or five inches below the solution level for cooling and directs the flame through a tubular combustion chamber which conducts the products of combustion down to and across the tub bottom where the products of combustion may be vented and distributed to give the rate and control of agitation desired.

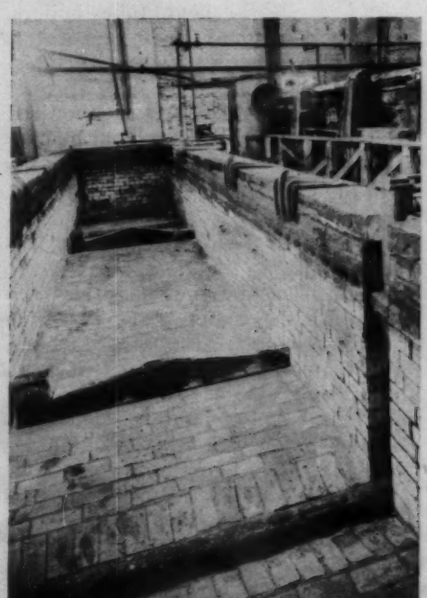


FIG. 1. Two 750,000 B.t.u. burners in place in the bottom of an empty tub.

Burner Controls Lock

Following the ignition of the main gas flame the burner controls lock themselves into a running position and will remain in that position until the desired solution temperature is reached. Thermostatic control actuates the control mechanism in such a manner that the flow of air through the solution is constant, and a flow of gas is turned on and off as heat requirements demand. This maintains a constant rate of agitation regardless of the solution temperature or rate of heat input. The burner system is entirely automatic in its operation and can control the solution temperature as close as one-half of one degree.

The combustion efficiency of the burner is very high and may be set to give any flue gas analysis desired. To run an orsat analysis it is necessary to place an inverted funnel beneath the liquid surface. The products of combustion rising through the solution will be trapped in the funnel and forced through the tube of the orsat by pressure which depends upon the depth at which the funnel is held. The general practice is to set the burner for about a 5 per cent air excess.

Submerged combustion should particularly interest the industrial gas man as it opens up new fields for the use of gas, is dependent upon gas for its operation and can not readily be converted to the use of a competitive fuel.

Submerged combustion can be used to advantage in many applications of solution heating. It is particularly adaptable to rapid distillation and concentration of solutions. It may be

used to heat and agitate many types of cleaning solutions.

One of the most practical applications for submerged combustion is the pickling of steel. In the removal of scale from steel, the rate of scale removal will be in almost direct proportion to the rate of agitation, which may be accomplished either by moving the work within the solution, or moving the solution about the work. By the use of submerged combustion, the pickling solution, generally sulphuric acid, is agitated and moved about the tank at a rate that would probably be impossible to achieve mechanically. The terrific agitation developed by a submerged combustion burner serves also to keep the temperature of practically any size tank so uniform that the temperature difference in any part of the tank can not be measured.

One of the advantages of submerged combustion for pickling is its flexibility. Each pickle tank in a plant can operate as an independent and efficient unit. It is not dependent upon a central heat generating system whose efficiency falls off at anything under a full load rating.

Production Increased

The production rate of a pickle tub can generally be increased 100 per cent by submerged combustion. The average time on various grades of steel will run from 30 to 60 per cent of former practice if the operating temperature of the tub is the same with submerged combustion as it was with steam. If it is desirable to operate the pickle tub at a lower temperature, the same rate of production can be produced with a 140° temperature using submerged combustion that produced with 180° on steam. In many cases, however, it is desirable to operate at a higher temperature and increase the rate of production to the highest possible point. The main time limiting factor so far has been the material handling equipment for moving steel in and out of the tanks. Experiments show that three and a half times the old rate of steel could be pickled in a tub with submerged combustion.

The reduced labor and overhead costs, combined with the lower investment in tanks and the lesser amount of floor space required, and an increased department production, have been found to effect such a saving that the installation can be sold on this basis alone.

The increased rate of production is due not only to the terrific agitation produced by the system, but also to the fact that the solution is not being diluted, as is the case with steam.

As steel is pickled in a quiet solution hydrogen bubbles form on the surface of the metal. These bubbles create a gas film and practically stop further action of the acid on the steel until the bubble is broken. This causes hydro-generation or acid embrittlement of steel and in many cases produces a mottled effect on the finished stock which may be a considerable disadvantage. The high rate of agitation produced in the solution by submerged combustion breaks down the formation of hydrogen bubbles before they are of measurable size. This constantly exposes the entire steel surface to action of the acid, producing a more uniform surface and eliminating all spotty work.

Using Gas in Power Boilers and Steam Generators

● **L. S. REAGAN, vice-president, The Webster Engineering Co., Tulsa, Okla.; addressing the Industrial Gas Section, Nineteenth Annual Convention of the American Gas Association, Cleveland, Ohio, September 27 to October 1, 1937.—(Abstract by G A S).**

THE use of natural gas as a fuel for the larger boilers and steam generators is becoming greater each year and as installations are made, many interesting discoveries have been made as to the action of gas as a fuel.

The following discussion is confined to the conversion jobs, as a boiler that is designed for the use of gas is not much of a problem as the boiler, furnace and burners are designed as a unit.

L. S. REAGAN

The most common types found are the Heine straight tube and the Stirling type bent tube boilers, with an occasional steam generator.

There has been and still is considerable discussion as to the proper amount of combustion space required for the combustion of natural gas.

There cannot be fixed a hard rule as to the number of cubic feet of combustion space per developed horsepower, due to the many different furnace conditions found. Primarily the amount of combustion space is controlled by the temperature at which it is desired to operate the furnace. This temperature is dependent upon the amount of black surface exposed to the radiant heat of the refractories and the distance this black surface is from the radiant surface.

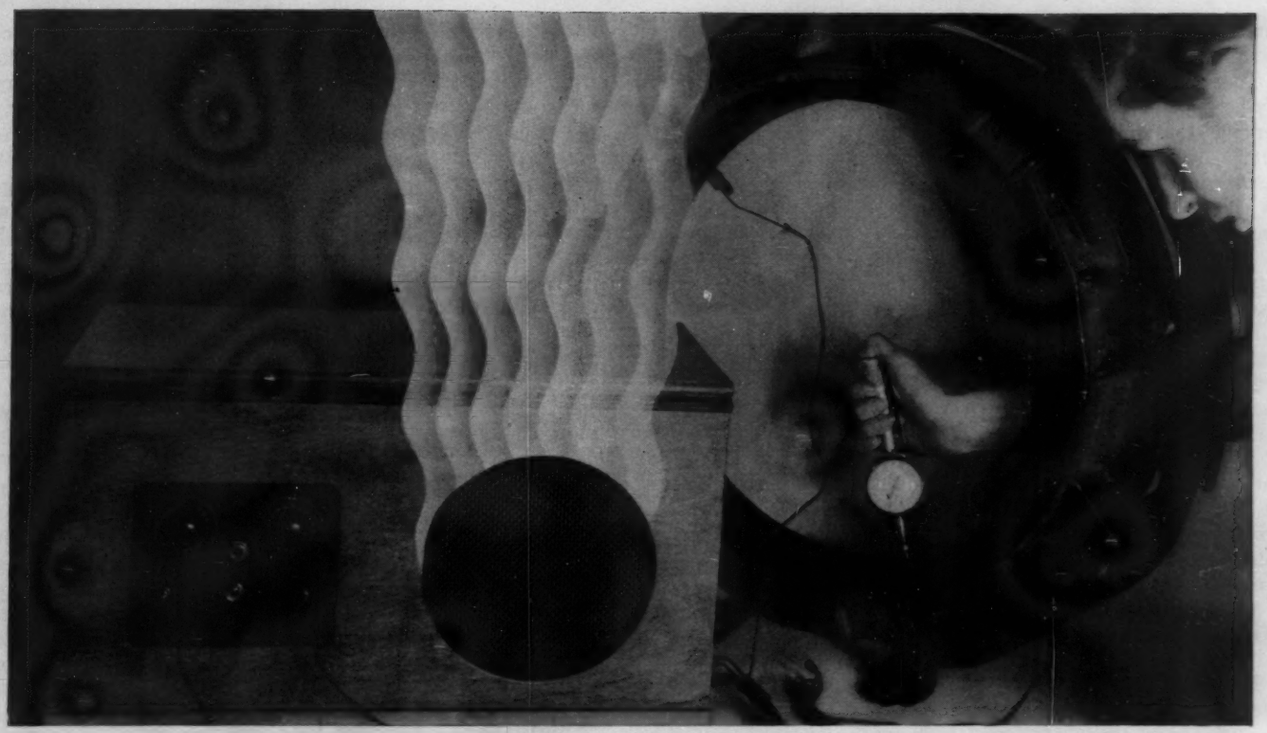
There is one installation where a 100,000 lb. boiler had a maximum B.t.u. release of 13,400 B.t.u. per cu. ft. or approximately 3½ cu. ft. per developed horsepower, but the temperature of this furnace was 2840° F. at maximum load. The reason for this was that the furnace was built for powdered coal and when gas burners were installed they were placed near the bottom of the furnace, which placed them approximately 25 ft. from the black surface, which in turn was small. This high furnace temperature caused undue maintenance with the result that changes had to be made. It was found that it would be cheaper to install a waterwall on the rear opposite burners than it would be to move the burners and duct work.

This wall was installed and furnace temperature was lowered to a maximum of 2280° F.

A case in the other extreme was of a low set Heine type boiler where the B.t.u. release at maximum rating was 60,000 B.t.u.'s per cu. ft. or approximately ¾ of a cu. ft. of combustion space per developed horsepower and yet the temperature did not exceed 2545° F. at maximum rating. This was because the tubes were close to the floor, approximately 8 ft., and the furnace width was greater than usual.

These two instances are used to illustrate the theory that combustion space is governed by proximity and quantity of black surface exposed to the radiant heat of the furnace.

A safe rule to follow on the average boiler of both the Heine and Stirling type with the standard settings is not to try and develop more than seven hp. per sq. ft. of exposed black surface and to use a combustion space of not less than 1½ cu. ft. nor more than 2 cu. ft. per developed horsepower, with the exposed black surface ap-



"LISTENING" to a clamp perform

Truly this is an age of miracles—at least in Dresser Laboratories, where an operator, using the Dresser-invented "Sealometer," *listens* for a note through a loudspeaker, in recording the sealing efficiency of a bell-joint clamp.

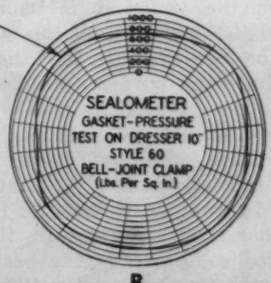
Just as this testing device is unlike anything else in the clamp world, so the Dresser Style 60 Clamp, itself, is something remarkable—something unequalled —when it comes to bell-joint-clamp performance.

For, exhaustive tests and installations from one end of the country to the other have proved that Style 60 gives more assurance of lasting reliability than any other make of clamp. *Send for Folder 3612G, which gives further details.*

A

PRESSURE ON BELL FACE

Charts A and B reveal an astounding contrast in the actual sealing efficiencies of two different clamp designs — something that was not apparent from just "looking at" the clamps, but which was brought out with striking clarity by the Dresser Sealometer, a unique audio-electrical machine invented by Dresser to test the sealing efficiency of bell-joint clamps.



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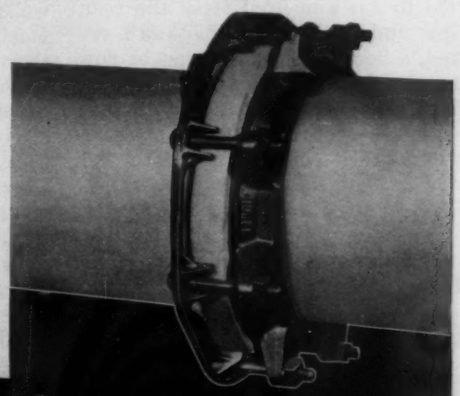


DRESSER BELL JOINT CLAMPS *Style 60*

S. R. DRESSER MFG. COMPANY, BRADFORD, PA. • *In Canada:* Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ont.

proximately 12 ft. from radiant furnace floor.

To obtain the above conditions on a Heine type of boiler it is necessary to remove the bridge wall and use the entire length of furnace and place burners in the rear or low end as well as change baffling, which will be described later.

On the Stirling type of boiler, burners should always be placed in the rear under the mud drum so that the full amount of combustion space can be utilized as well as having the flame travel toward the front wall and up the tube bank so that there will be no concentration of heat on the bend at the lower end of the tubes where they enter the drum, as there would be if the burners were installed in the front wall. If the rating is 100 per cent or less, burners can be placed in front walls in both of the above cases if it is deemed that the expense of changing baffling, etc., is not warranted.

In the case of a boiler using powdered coal, where a gas insert cannot be used and separate gas burners must be installed, these should be placed above the coal burner so that the heat will be close to the black surface. Where the powdered coal burner is removed entirely and gas is used with oil as stand-by, a false floor should be built, giving approximately 1½ to 2 cu. ft. of combustion space per developed horsepower with gas burners close enough to the floor to keep it in a radiant condition.

Baffling

When a Heine type boiler is converted to gas and fired from the rear or low end with the bridge wall removed, a horizontal baffle must be run from the lower end of the vertical baffle (which has been cut off to the second row of tubes) to the rear or low end of the boiler on top of the second row of tubes.

In the case of a Stirling type boiler, the baffling does not have to be changed as to position unless the first baffle is closer than the second row of tubes, then it must be moved back.

There are still in service quite a number of straight tube boilers that are horizontally baffled with the first baffle covering the first row of tubes with an opening to the first pass at the rear or low end of the boiler. To get the highest efficiency this baffling should be changed to a combination vertical and horizontal baffle, but if difference in efficiency does not warrant this change (increased efficiency is approximately two per cent) then the horizontal baffle on the first row of tubes must be raised to at least the second row and the burners installed in the front or high end of the boiler.

Many a gas conversion installation has failed due to leaky baffles which allowed the by-passing of the products of combustion to reduce efficiency due to high stack temperature. Before placing the boiler into service, carefully check for leaks and repair each one, no matter how small. Where there has been considerable slagging of baffles from coal, they will be tight at first due to the slag, but in a short time this slag will crack or melt off, leaving very serious leaks. For this reason draft in each pass should be tested at least once each week for approximately four weeks after gas has been used, so as to check for leaks.

Furnace Insulation

Many industrial gas engineers do not pay enough attention to the heat losses through the furnace walls when making a conversion. They do not realize how many B.t.u.'s per square foot are lost through the average fire brick wall of 13½ in. thickness, which is the usual thickness. By taking this 13½ in. wall and placing it in first class condition and backing it up with 4½ in. of insulating brick, 165 B.t.u.'s per sq. ft. of surface can be saved with furnace temperature at an average of 2200° F.

There is considerable question among engineers of the relative value of an air cooled wall over a solid wall. Experience has proven that in the case of natural draft where there is not enough draft to pull all air for combustion through the air cooled walls, a well insulated solid wall is the most economical. Furthermore, where there is enough draft to pull all air through the walls, it is usually so great that the velocity of the products of combustion are such that they pass over the black surfaces so fast that they do not give off as many B.t.u.'s as they should. Therefore, unless forced draft is used, where air can be pulled through hollow walls and discharged through burners into furnace close to a negative pressure, the well insulated solid wall is the best. The water wall type of construction is being used to a great extent today, even in the smaller boilers, and this is considered the proper way to insulate a furnace when erecting a new boiler and furnace.

So many times burner equipment having a high draft loss across burner is installed because a high draft is available and because it is cheaper than larger equipment. This is absolutely wrong where natural or induced draft is used. Whenever the furnace draft starts to exceed .15 in. W.C. the efficiency is beginning to drop off very quickly due to the increased velocity of gases over the heating surface, resulting in high stack temperature. High draft also increases the leakage of air through furnace walls, increasing the excess air and diluting or cooling the products of combustion.

If it is at all possible, keep furnace draft within .15 in. W.C. and in no case exceed .25 in. W.C. in the furnace. Larger equipment is cheaper than poor efficiency in the long run.

There is a wide deviation in views of engineers as to what efficiencies can be had with natural gas as a fuel.

With proper burner equipment properly installed and controlled, an average of 75 per cent overall efficiency can be obtained and maintained in both the straight tube and bent tube boilers without economizers and superheaters. When a superheater or economizer only is used, this can be stepped up to an average of 77 per cent. When both superheater and economizer are used, it is possible to average as much as 80 per cent.

Gas Burner Equipment

There are really only three distinct types of burners, namely, the Multiple Jet Atmospheric type for pressures 2 lb. and below, and the Ring type and Centrally fired type of high pressure type register burner for pressures of 2 lb. and above. Any of these burners, regardless of whose make, when properly applied will give high efficiency.

In firing the large power boilers, the high pressure burner should always be used wherever possible as higher ratings, shorter fire and less cost of equipment may be obtained.

■ ■

Cedar Rapids Gas Co. Installs Power Engines, Remodels

Cedar Rapids (Iowa) Gas Co. will hereafter produce its power both for illumination and air conditioning, following installation of two 42-hp. Waukesha natural gas engines and a 50-kw. generator.

The main office has been completely remodeled and air-conditioned, and the lighting has been tripled. The home service department has been doubled in size, remodeled, and air conditioned.

The company's office at Marion has also been entirely remodeled.

■ ■

Houston Natural Odorizes

The Houston Natural Gas System is now odorizing all its distribution systems by means of equipment installed along the main lines serving the various distribution areas.

COLD WEATHER COMING!

A DRESSER SPLIT REPAIR SLEEVE ON HAND TODAY MAY SAVE YOU PRECIOUS HOURS TOMORROW!

Stock one for every size of pipe in your system —then replace it when used.

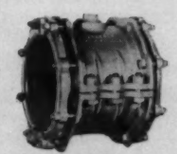
Now is the time to get ready for winter pipe-breaks. Be prepared for quick action with Dresser Repair Sleeves—your best "ace in the hole" against service interruptions.

Typical report from a recent letter: "Four days ago I used your sleeve on a 6-inch break . . . We saved $10.50 on this repair . . . Ship us two each Style 57 for 6, 8, 10, and 12 inch pipe. I want to be prepared for emergencies."

Why not order *your* requirement today?

FOR STEEL PIPE

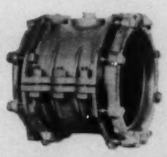
STYLE 52A CAST SPLIT SLEEVE. Encloses and repairs screw collars, circumferential welded joints, splits and holes up to 8" in length. Maximum working pressure, 500 lbs.



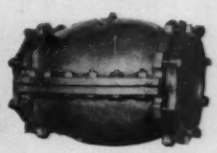
STYLE 73 CAST SPLIT SLEEVE. For same type of repairs as Style 52A, but for working pressures up to 250 lbs. per sq. in.

STYLE 54A CAST SPLIT SLEEVE. Encloses and repairs bolted joints of various types. Maximum working pressure: 500 lbs. per sq. in.

FOR CAST-IRON PIPE



STYLE 57 CAST SPLIT SLEEVE. Encloses and repairs splits and holes up to 8" long in the straight run of pipe. Maximum working pressure, 250 lbs.



STYLE 26 CAST SPLIT SLEEVE. Encloses and repairs broken or split bell-and-spigot joints. Maximum working pressure: 75 lbs. per sq. in.

DRESSER SPLIT SLEEVES

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The Liquid Seal Principle Applied to Odorization

By ROBERT M. HUTCHISON
Chief Engineer, Houston Natural Gas System

IN meeting the requirements of the law recently passed by the State of Texas making odorization of natural gas mandatory, we designed our own odorizing equipment which incorporates a feature calculated to prevent liquid odorant from entering directly into the line no matter what the conditions. This feature is deemed desirable in the light of the fact that most odorants in common use do not have a constant coefficient of volatility. This being the case, if the liquid odorant is permitted to enter the line an eventual gummy, non-volatile residue of the heavier constituents of the odorant would tend to accumulate over a period of time in the lines and cause trouble in such equipment as meters.

To odorize a stream of gas without allowing the liquid to come in direct contact with the main flow, it is necessary to by-pass a small part of the gas, saturate it with odorant and direct it back into the line where the saturated gas is mixed with the main flow, producing a mixture containing the desired concentration of odorant. To divert the proper quantity of gas through the odorizer an orifice is inserted into the line of such size as to create a differential of from 2 to 3 lbs. at maximum flow. The orifice flanges are fitted with a flange tap in both the up-stream and the down-stream flange to provide connections for the by-pass circuit. Within the odorizer the by-passed gas stream is impinged on a small quantity of odorant which is maintained at constant level. The gas comes through a perforated cap roughly resembling a shower bath nozzle directed downward and the plane of the perforations is located at a depth of ¼ in. in the odorant.

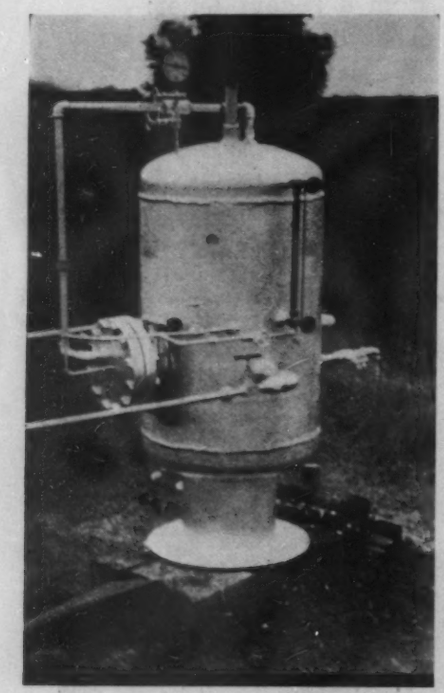


FIG. 1. A 24-inch, 50-gallon capacity odorizer, connected to a gas well near Houston, odorizing 2½ million cubic feet daily by by-passing about 4500 cubic feet of free gas daily at 100 pounds pressure.

The odorizing unit as a whole consists of an odorant storage tank fitted with a gage glass, the odorizing chamber and level control mechanism, and an overflow tank of the same capacity as the storage. The odorant is maintained at constant level in the odorizing chamber by means of the liquid seal principle and a float operated valve located on the odorant inlet line to compensate for changes in pressure in the gas line while the liquid seal is adjusting itself to equilibrium for the new condition. The odorant as needed flows from the storage into the odorizing chamber in which the float is located. The odorizing chamber itself where the gas impinges on the liquid odorant is a small, shallow connecting tank located just sufficiently below the constant level of the odorant as to submerge the perforations in the cap in a ¼-in. depth of odorant. As the more volatile parts of the odorant are carried away by the gas, the heavier ends settle at the bottom of the odorizing chamber from where they pass through a connecting drain tube into the float chamber. Since there is no turbulence in this tank the heavier parts of the odorant that have not been absorbed by the gas settle and stratify and the fresh odorant entering from the storage flows over the top of this sludge and into the odorizing chamber. Thus there is always a fresh supply of odorant in the chamber and a more constant rate of evaporation and absorption by the gas stream is made possible, resulting in a more uniform concentration of odorant in the line.

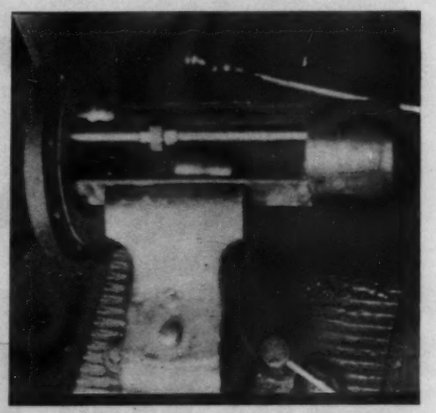


FIG. 2. The float and evaporating chamber of an 8-inch odorizer.

Should the float valve fail to operate when a sudden change in the line pressure occurs, the liquid odorant is prevented from entering the main gas stream by an overflow located just above the constant level. This overflow dumps the liquid into the overflow tank where it can later be recovered.

■ ■

Panhandle Loop Project Done

Last of the loop construction work on the 281-mile project of Panhandle Eastern Pipe Line Co. to meet natural gas demand at points in Indiana and Detroit was completed the middle of October, according to J. S. Stevenson, chief engineer, with the tying-in and purging of the west section of the Haven Loop. A deadweight test was run on October 17 and the line was thereafter available for service.

■ ■

Grant 42-Mile Line to Cabot

Permission to construct a 42-mi. 12-in. high-pressure gas transmission line from a point near Sissonville, W. Va., to a point near Big Bend, W. Va., has been granted by the Public Service Commission to Godfrey L. Cabot, Inc. The company has a gas well a mile west of Sissonville, and a compressor station near Big Bend.

■ ■

Houston Gulf Lays 8-In. Line

Houston (Texas) Gulf Gas Co. is laying 18 miles of 8-in. welded line from the Satsuma field to a point southwest of Houston where it will tie into the Refugio-Houston transmission line.

SPEED UP

YOUR SERVICE CONNECTIONS AND REPAIRS!

● Every gas man knows the importance of making fast connections and repairs, especially on service lines. How Dresser Style 40 Long Service Sleeves help do this may be judged by reports from actual users.

Says one customer: *"We find that these sleeves save considerable time when making new connections or repairing services, and reduce the interruption to our service. All connections are made without shutting off the gas."*

Writes another customer: *"In order to avoid a long period of shutdown in our operation we have used Dresser Sleeves to install new valves where defective valves have been discovered."*

Another typical comment is this: *"We know of no fitting that saves any more time and money than your Style 40 Sleeves."*

FACILITATES WORK 8 WAYS

On new services, reconnections, or service renewals, or when renewing mains, installing new valves or fittings, or making repairs to services or service joints, Style 40 Long Sleeves *speed up* and simplify service work because:

1. CONNECTIONS CAN BE MADE IN FROM 1 to 3 MINUTES. Joints come completely assembled. All you have to do is stab in the *plain-end* pipe and tighten the nuts.

2. JOINT MAKING IS SIMPLE. Ordinary labor installs. One tool only—a wrench—is required. There is no rigging up of complicated installation apparatus, no "human equation." *Plain-end* pipe is used, *eliminating threading* both in shop and in cramped quarters on job (as near a wall). Size of the excavation is reduced to a minimum. Wet ditch or bad weather does not halt work. Every connection is its own union. You get a good joint on the first attempt every time.

3. LONG LENGTH of the sleeve spans variations in space between pipe ends, an especially valuable feature on cut-ins, tie-ins of extensions, and closures, because you don't have to cut the pipe to exact lengths. This saves valuable time, particularly in crowded quarters.

4. SUDDEN LINE DISTURBANCES that often pull pipe ends apart are likewise taken care of by the greater body-length of Style 40 Sleeves. Says one customer: *"Our lines are located in an area much of which has been undermined by the removal of coal. This causes numerous surface breaks. Then, too, lines in this section are either laid up, down or along the side of a hill which is likely to slip at any time. Account of these conditions we find the Dresser Long Sleeve Style No. 40 more satisfactory and safer to use."*

5. SAFETY from explosive hazards is inherent. There is no flame, no torch. Joints can be made under gas pressure, saving shut-downs.

6. ON CUT-INS OF NEW PIPE to replace lengths of corroded services, considerable work is saved because all that is necessary is to cut the pipe, slide the sleeve on, and tighten the nuts. (Later on, additional lengths of pipe can be sleeved in at either end with the same sleeve, which are easily demounted.) There are no threads to cut on the job, no unions underground, no work trying to screw the fittings on, no tearing out of the whole pipe assembly, no big excavation required (see sketches below). This same simplicity is also equally useful in installing new valves or other fittings into an existing service. Says one customer: *"We like vour sleeves very much as they always fit good and this is an important feature when making a tie-in on a line that is feeding several customers."*

7. SLIGHT MISALIGNMENTS of pipe with street tee, etc. (as when pipe is pushed through with a driving jack) are easily absorbed.

8. USED AS A REPAIR SLEEVE, Style 40's can be slipped over a corroded section of pipe, or the defective pipe (up to about 8" in length) can be removed and the gap enclosed with a Style 40.

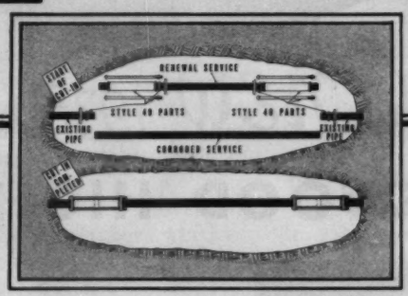
HARMFUL STRESSES ABSORBED

Not only do Style 40 Long Sleeves provide simple and quick connections. They also give permanently tight joints, especially on high-pressure service. The best evidence of this is the thousands of Dresser Sleeves still in use today after almost half a century of service. Their design has been proved. Joints "ride" with the line. This flexibility absorbs harmful stresses and pipe leverage (at the main or in service) resulting from expansion, contraction due to frost, soil settlement, traffic shock, vibration, careless backfilling of adjacent water or sewer services, etc., thus preventing the failures that often occur in rigid service joints, or in rigid tees, ells, or saddles at main. Moreover, pipe ends have full thickness—there are no threads to corrode through. Sleeve can be assembled in only one way—the permanently tight way.

Dresser Long Sleeves can also be salvaged, and this feature, together with the elimination of threading and their trouble-free performance, makes them most economical to use.

(Right) 1¼" I. D. Dresser Style 40 Long Service Sleeve, showing 2-bolt construction supplied for sizes ½" I. D. to 2" O. D., incl. (2" I. D. has three bolts). Sleeve-body length is 12" for all sizes.

(Above) Longitudinal section through a Style 40 Long Service Sleeve, showing how it joins plain-end pipe in a flexible, yet permanently gas-tight connection. Note space permissible between pipe ends. All parts are standard and accurately manufactured within close limits.



(Left) Cut-ins to install replacement lengths of pipe (or valves, tees, and crosses) are facilitated by making renewal connections with Style 40's, as shown in these two sketches. This method eliminates unions and threading, reduces the size of the excavation.

HOW TO ORDER

Specify: (1) quantity; (2) nominal size and O.D. of pipe; (3) style number; (4) whether sleeves are to be black or galvanized; and (5) service—natural gas, manufactured gas, etc.

FREE SAMPLE

Write for free sample of Style 40. Simply specify size. No obligation. Information and prices on complete line of other Dresser Service Fittings also furnished promptly.

S. R. DRESSER MFG. CO.

BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front St. W., Toronto, Ontario

NO. 2 IN A SERIES OF ADVERTISEMENTS ON DRESSER PRODUCTS FOR SERVICES

★ PRESENTING . . .

3445 CT (Closed Top)
3485 OT (Open Top)

The NEW 1938
WEDGEWOOD HIGH-BROILER MODELS

★

NEW WEDGEWOOD BROILER AT FULL OVEN-HEIGHT

★

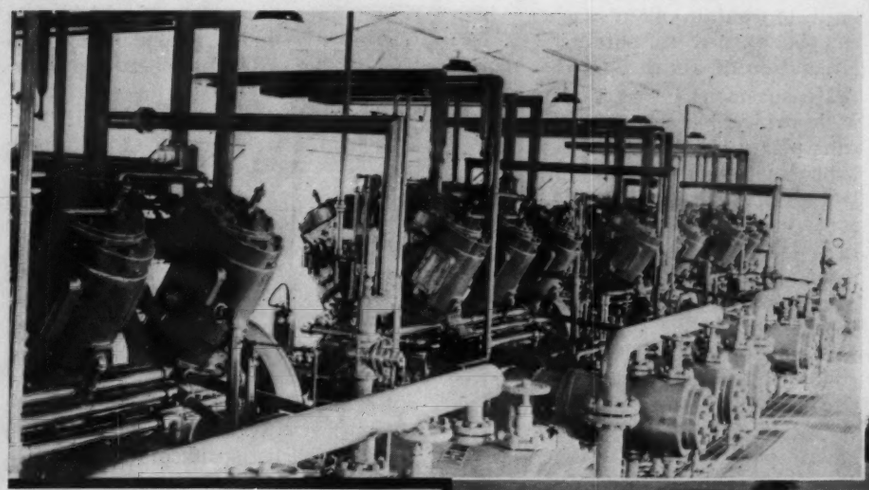
NEW LOW-TEMPERATURE HIGH-SPEED OVEN BURNER

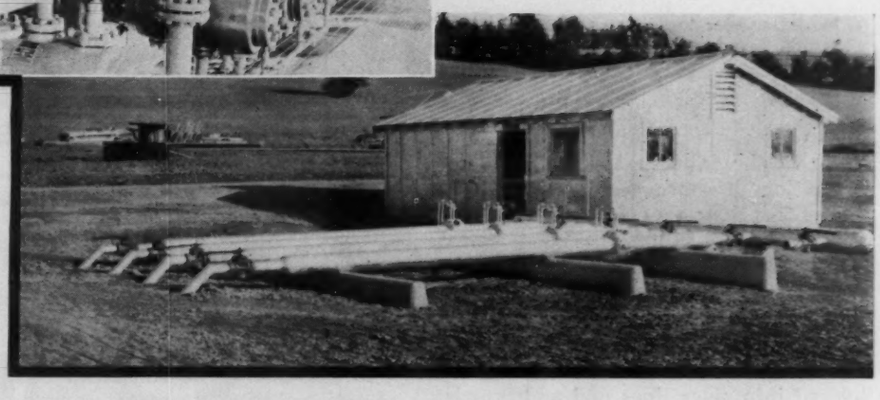
For high-speed oven heating or for slow low-temperature oven cookery.

This beautiful new Range has full de luxe Wedgewood styling and many new features that every housewife will admire! Wedgewood's new High Astogril Broiler, the last word in broiling convenience—the newly designed Low Temperature—High Speed Oven Burner—Speed-plus-Simmer Burners—Extra Big Oven, 20 in. deep — Extra-Large Cooking Top with wider spaced burners — Double Lift-up Covers — Automatic lighting oven and top burners — extra-heavy insulation — full porcelain enamel inside and out!

THE MODERN GAS RANGE MAKES FRIENDS FOR GAS

JAMES GRAHAM MANUFACTURING CO. • LOS ANGELES • SAN FRANCISCO • NEWARK, CALIF. • PORTLAND, ORE.





AT LEFT: An interior view of North Penn Gas Company's compressor station in Potter County, Pa. Equipment includes four 6-cylinder engines. BELOW: Meter runs of the North Penn Company, showing Nordstrom lubricated plug valves at each end.

Pennsylvania Utilities Build New Compressor Stations

SINCE production pressures have declined alarmingly in northern Pennsylvania, due to several contributing factors, both the Sylvania Gas Co. and the North Penn Gas Co. have recently built compressor stations in the field so that gas may be moved freely to domestic and industrial marketing centers. When this field, known as the Hebron Township gas field, was flush, formation pressures were sufficient to drive the gas through long transmission lines without the need of intermediate booster stations. Rock pressures as high as 2,500 lbs. were not uncommon. During the spring and summer of 1937, these pressures dropped to a point where the wells would flow large amounts of gas, but would not furnish sufficient transmission pressures to deliver the gas more than a few miles down the pipe lines.

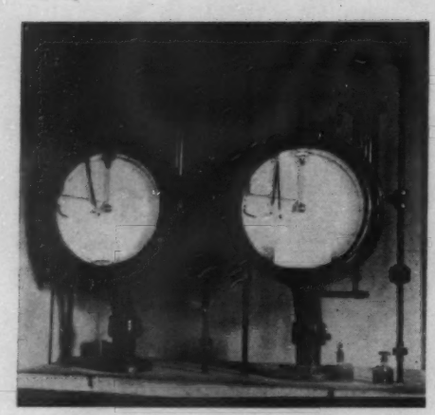
Sylvania Gas Co. was one of the first companies to take the initiative in building compressor stations, with North Penn and Cabot following in the order named. All these companies realize that the remainder of the flowing life of this field will be comparatively short, and some time in the near future insufficient gas will be produced from existing gas wells to justify operation of even the small units now being used to compress the gas. Therefore, all the companies in the Hebron Township field have followed the policy of erecting more or less temporary stations, with equipment installed which may easily be dismantled and moved to other fields upon relatively short notice. All compressors installed in the field are of the V-type engines with horizontal compressor cylinders, varying from four-cylinder units to as many as eight to the unit.

Where compressor stations have been installed in Pennsylvania during previous years, the majority have been permanent, utilizing heavy duty, large horsepower machines that were intended to perform for many years without the thought of moving to other fields. Some of these stations, erected during the early years of gas production in this state, were equipped with solid stone floors, which were cut in the nearby quarries and joined when laid so as to rest on bed rock and present a surface with no vibration whatever.

In the Potter County fields, erection of stations was found to be much more difficult, due to the moraines of the glacial age which cover this area. In some places, during drilling operations for cooling water, these glacial deposits have been found to be over 100 ft. in thickness, composed of sand, silt, and boulders—difficult to prepare for adequate foundations. Sylvania engineers excavated the foundation pits with the toe and heel method, which gives the foundation blocks a heavier and more substantial footing at each end, and which is said to minimize vibration to a large degree.

When this company first began construction of the second and largest station built in the field, the temperature was many degrees below zero F. Blasting was required for excavating, and again for removing the excavated material after it had stood over night. Forms were made in this kind of weather, and concrete poured for the engines. Precautions were taken, however, to prevent freezing of the fresh concrete so that spalling would be eliminated. Steam lines from a temporary boiler setting, which was later converted into a permanent heating plant, maintained comfortable temperatures in the several buildings housing the compressors and auxiliary equipment. The steam lines were connected so that they would surround the foundation blocks, and later the entire floor was covered with heavy tarpaulins to prevent the radiation of heat to the atmosphere.

After the stations were completed,



Meter recorder installations inside the office, showing Foxboro flow meters.

lines were connected directly from the wells to the intake headers, so that formation pressure could be utilized as the first stage of compression. The cylinders attached to the engines were selected with a bore sufficiently small so that, when the gas passed through them, pipe-line pressures were generated that would deliver the gas to points where it was marketed, or delivered into older lines and additional compressor stations for further transmission.

Two types of cooling are followed in the field. One, at the Hebron station of Sylvania Gas Co., is gravity feed of water from a small creek which furnishes sufficient water for all necessary jacket and compressor cooling. At the larger station, water is produced from deep wells, drilled into the lower section of the glacial drift, and flowed by gas lift. Residue gas from these wells, after being separated from the water, is used as fuel for the gas engines and boilers. This was done to save a reduction of fuel to the engines and to eliminate the necessity of extra compressors for boosting the gas lift gas to pipe-line pressure again.

In order that all the possible thermal value of the exhaust gases can be utilized during the severe winters in that part of the country, the exhaust pipes from the multi-cylinder gas engines were extended vertically above the units and then turned to extend through the wall of the building next the power section of the compressors. Radiation of the heat through the walls of the exhaust pipes helps to maintain a comfortable temperature within the steel buildings, with the result that a lesser amount of steam is required. To offset uncomfortable heat during the short summer, the buildings of Sylvania Gas Co. were built to contain many sashes which can be opened to obtain maximum circulation of air through the room.

Measurement of gas is accomplished with orifice meters, with the meter runs placed above ground outside and supported upon concrete piers, controlled with lubricated stops. The recorders were installed in small buildings separate from the other equipment, and in one instance, two were placed in the plant office building adjacent to the field telephone, so that readings may be transmitted to the general office at any time during the day or night. Electric power is obtained by Sylvania Gas Co. from small, portable, gas engine driven compact machines, two of which were installed in the auxiliary building to furnish lights for the plant and other requirements.

All of the stations installed in Potter County were designed for short time service, with all auxiliary machines and equipment placed in such a manner that a high salvage value will accrue if it becomes necessary to move them elsewhere. It was stated by engineers of the various companies operating in this field that about all that would be left in the field will be the concrete foundations and floors, since all important machinery can be easily disconnected and mounted upon trucks with little difficulty.

H. H. Cuthrell Tells A. G. A. Delegates of World's Fair Gas Requirements

GAS requirements for the New York World's Fair in 1939 will approximate 750,000,000 cu. ft., according to Hugh H. Cuthrell, vice-president of The Brooklyn Union Gas Co., in addressing the American Gas Association during its recent convention in Cleveland. Mr. Cuthrell is president of Gas Exhibits, Inc., formed to conduct the gas industry's exhibit at the Fair.

The Brooklyn Union Gas Co. has been working for two years with officials of the Fair, Mr. Cuthrell said, in designing and installing a distribution system for the Fair area. Service will be provided by two 12-in. high pressure mains, and it is estimated that the following distribution lines will be required: 24,000 ft. 4-in. high pressure; 15,000 ft. 6-in. high pressure; 9,000 ft. 8-in. high pressure; and 3,300 ft. 12-in high pressure. Underground work is progressing rapidly.

Estimated cost of rendering this service to be borne by The Brooklyn Union Gas Co. and Consolidated Edison Co. of New York, is approximately $350,000.

The Administration building is now open, Mr. Cuthrell told A.G.A. delegates, and gas is being used for space heating, water heating, and cooking.

The gas industry has taken space in the Home and Shelter Section of the fair grounds, according to Mr. Cuthrell, and will erect a group of buildings housing a central court in which will be portrayed the story of gas production, distribution, and utilization, an auditorium in which daily events will be held, and an area for a co-ordinated display of individual manufacturers' products. There will also be a completely gas-equipped home on the site.

Gas Exhibits, Inc. is a non-profit corporation, organized after long study by a committee appointed by President Herman Russell of the A. G. A. in October, 1936. The corporation was endorsed by the executive board of the A. G. A. and the board of directors of the Association of Gas Appliance and Equipment Manufacturers. Gas Exhibits, Inc., is directed by a board made up of 10 men nominated by the president of A. G. A. and nine manufacturers nominated by the president of the A. G. A. E. M.

■ ■

Cooper To Retire; Johnson Succeeds Him at P. G. & E.

Herbert M. Cooper, veteran of Pacific Gas and Electric Co. and for many years manager of the Drum Division with headquarters at Auburn, is retiring from the company service on January 1. This retirement is under the new pension policy of the company which permits retirement at the age of 65.

Cooper is to be succeeded by J. R. Johnson, who has been district manager at Placerville. Johnson is a graduate of the Electrical Engineering Department of Stanford University and was formerly with Western States Gas and Electric Co.

■ ■

McCook Wants Gas by Feb. 15

The city council of McCook, Neb., according to news dispatches, has passed a resolution giving the Citizens Natural Gas Co. until February 15, 1938, to furnish the city with natural gas, under the terms of a franchise granted several years ago. The franchise agreement specified that the company would pipe natural gas into McCook when it became available within 30 miles. Pipe lines have been laid to Oberlin and Cambridge nearby.

AT LAST—
A Gas Range Really Designed to Fit Into Modern "Planned" Kitchens!

Completely modern in every detail: extra large oven, 18" wide, 20" deep. May be had with elevated broiler or with extra pastry oven. Roller bearing drawers, chrome burner pan, and chrome broiler pan with smokeless rack are included in a long list of quality features.

The New
DETROIT JEWEL
and
GARLAND
Built-in, Flush-with-Wall
Senior De Luxe
GAS RANGE

Here is the answer to the long-felt need for a gas range styled and constructed to dovetail perfectly with modern "planned" kitchen layouts, and lend a completely built-in effect to the entire room.

The new Detroit Jewel and Garland Senior DeLuxe range fulfills every requirement. Its brilliantly modern square design and the absence of overhanging parts permit a tight, close fit with built-in cupboards and cabinets. The top of the range is the exact height of other kitchen equipment; and the absence of open spaces insures an even, unbroken line throughout the room.

Unique design permits the range to fit flush with back wall. Vent is through back guard. Recessed base makes for easy and complete cleanliness.

Luxurious and permanent beauty is assured by the use of Monel for the one-piece cooking top. Back guard and the strikingly modern lamp are in chrome. This outstanding beauty is combined with a new "high" in cooking efficiency, convenience, and economy—the finest and most complete range ever to bear these famous names.

Three styles to fit every requirement: 4-burner separated top as illustrated, also with conventional 4-burner top and with 6-burner top. Lamp, time reminder and condiment set to harmonize. Write, wire, or phone for complete details.

Delivery Date To Be Announced

DETROIT-MICHIGAN STOVE CO. • DETROIT

Donald McDonald, American Meter Co. Officer, Dies

DONALD McDONALD, secretary-treasurer of American Meter Co. and since 1922 a director of the company, died on October 8 in New York City. Death was due to heart trouble. Funeral services were held at the First Presbyterian Church, New York, on October 10. Interment was in Albany, N. Y.

D. McDONALD

Donald McDonald's business association with the gas industry began 51 years ago when he entered the manufacture of gas meters with D. McDonald & Co. at Albany, N. Y., founded by his grandfather in 1855 and continued by his father, William McDonald. He became manager in 1912.

Taking an active part in forwarding the co-operative interests of the gas industry as a whole, Mr. McDonald was president of the Society of Gas Lighting in 1932-1933. In 1924-1925 he served as a director of the American Gas Association, and subsequently was a member of the Advisory Council. He was also a member of the original committee which brought about the American Gas Association Testing Laboratory in Cleveland. As a member of the American Gas Association Gas Safety Council, he was particularly active in having the code adopted as standard.

He was a founder and the treasurer of the Association of Gas Appliance and Equipment Manufacturers. He was a recognized authority on positive displacement measurement.

■ ■

Chemical Society Medals To Tone and Crane

Dr. Frank J. Tone has been elected to receive the Perkin Medal of the Society of Chemical Industry for 1938. The medal is awarded annually for valuable work in applied chemistry and will be presented this year to Dr. Tone for his work in the development of abrasives and refractories. The medal will be presented on January 7. The Chemical Industry Medal of the Society will be presented to E. J. Crane, editor of *Chemical Abstracts*, for his work in abstracting technical and scientific writings in all fields of the chemical industry.

■ ■

Cities Service Construction Adds to Line Capacity

Construction work to meet increased winter gas demand was completed by Cities Service Co. during the summer as follows:

Forty-seven miles of 12-in. line from the Seminole 16-in. main line to the Fitts field, which will add from 15,000,000 to 20,000,000 cu. ft. of gas daily.

Eight and one-half miles of 10-in. pipe line from the Oklahoma City 20-in. to the Edmond field, adding from 15,000,000 to 20,000,000 cu. ft. a day.

A treating plant and field gathering system in the Lyons area. The plant treats sour or sulphur gas for commercial use.

Two field compressor stations of 230 hp. each, with gathering lines, in the Pampa field for well proration.

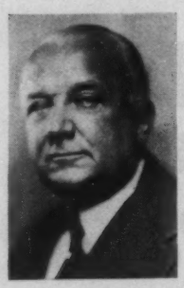
A dehydration plant in Pampa, Texas, was to be completed about Nov. 1 which will remove moisture from the gas before it is turned into the main transporting system. It is expected to make possible the handling of more gas in the Pampa-Wichita 20-in. line, where heretofore the capacity has been reduced by formation of ice and accumulation of moisture.

On two important points the plant differs from other installations. It does not involve the usual refrigeration or bubble cap contactor, the company explains, and it is located on the intake of the station instead of the discharge side. A saving on investment of two-thirds is effected by the new type, it is stated, and there is additional saving in operation and maintenance. Different chemicals may be used.

■ ■

William Sweatt, Founder of Minneapolis-Honeywell, Dies

William R. Sweatt, founder and former head of Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., died on October 12 in Minneapolis, age 71, after an illness of nearly a year.



W. R. SWEATT

Mr. Sweatt's first company was the Electric Thermostat Co., formed in 1885, with Mr. Sweatt as secretary-treasurer. That company later became the Minneapolis-Heat Regulator Co., and in 1927, the Minneapolis-Honeywell Regulator Co. Mr. Sweatt was named president of the company in 1893 and continued in that position until 1927, when he became chairman of the board of directors. He retired from active affairs in 1933.

Under his active supervision Minneapolis-Honeywell contributed to the field of automatic controls and control systems, among other things, clock thermostat control, limiting devices and electric safety devices, and recycling instruments. The company gained a world-wide reputation under Mr. Sweatt's management.

■ ■

Lusk, Wyo., May Get Gas

Rocky Mountain Gas Co. has applied to the town of Lusk, Wyo., for a 50-year franchise to furnish natural gas. A 22½-mile pipe line would be built, according to the proposed franchise, to bring the gas from the Ohio Oil Co.'s absorption plant in the Lance Creek field. The company would construct its own mains, supply lines and laterals, it is stated.

■ ■

Owatonna Buys Rights

The city of Owatonna, Minn., has purchased natural gas equipment and rights of the Interstate Power Co. in Owatonna. The city paid $125,000.

B. J. Mullaney Resigns as Peoples Gas Vice-President

BERNARD J. MULLANEY, who recently resigned as a vice-president of The Peoples Gas Light and Coke Co. of Chicago, Ill., retired from active business life on November 1. Paul W. Herring, who since 1924 has been assistant to Vice-President Mullaney, has been appointed director of employee relations, the department formerly known as the industrial relations department.

Mr. Mullaney has been a member of the executive board of the American Gas Association since 1922. He was president of the Association in 1929-30, after having been a vice-president from 1927 to 1929.

B. J. MULLANEY

The story of his activity for and with the association closely parallels the story of his work with the Peoples company. Coming to the company in 1917, he was appointed Director of Public Relations in 1919, and was elected vice-president in charge of public and industrial relations in 1924. As regards the Association, he was present at the first annual convention in 1919, and in that year helped to start systematic Association attention to advertising and publicity.

Mr. Mullaney was in newspaper work for 16 years. In Chicago he became successively reporter, editorial executive, and political editor of the *Chicago Herald* (subsequently *Times-Herald* and *Record-Herald*). He left newspaper work to enter the advertising field, in which he spent the years from 1903 to 1916, punctuated by four years of service as secretary to the mayor of Chicago and as commissioner of public works for the city.

Mr. Herring joined Peoples Gas Light and Coke Co. in 1908 as clerk in the old street (now distribution) department. He soon became assistant chief clerk, later organized the payroll and stores accounting divisions, and in 1912 took charge of the merit system. In 1919 he organized the employment division, and in 1924 was appointed assistant to Vice-President Mullaney.

■ ■

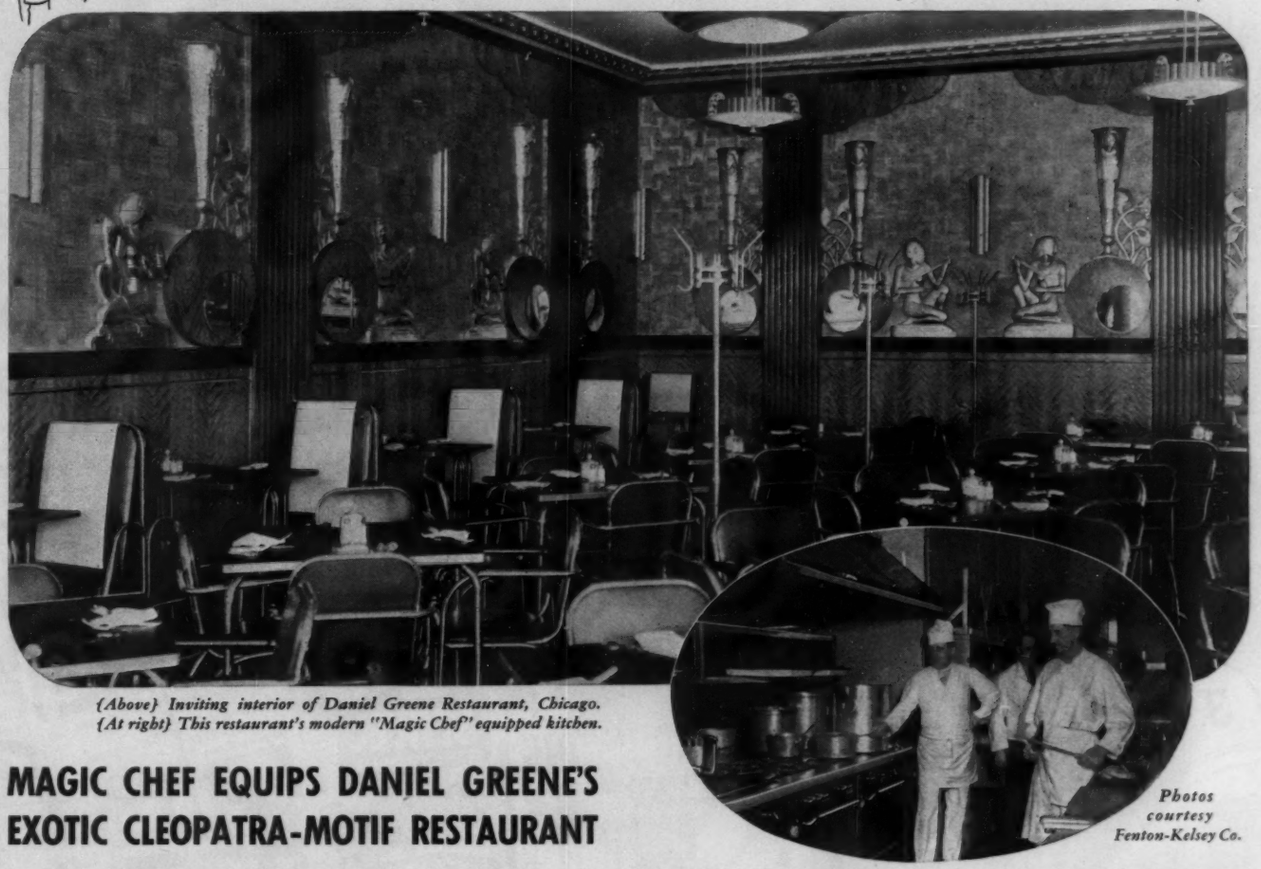
Natural Gas Served In Hydro And Sweetwater, Okla.

Natural gas was made available in Hydro, Okla., on October 13 by the White Gas and Fuel Co. of Sayre, Okla., following completion of approximately ten miles of 3-in. and 2-in. welded pipe line. S. O. White heads the distributing company.

Consolidated Gas Utilities Corp. furnishes the gas for Hydro, according to W. C. Burris, manager of the Western Division. About 150 customers will be served.

Sweetwater, Okla., was to have natural gas about November 1. White Gas and Fuel Co. began construction the middle of October of a 3-mi., 2-in. line to take gas to Sweetwater from a point on the Consolidated Gas Utilities Corp.'s main transmission line which runs south of the town.

Where Smart South Chicago Dines



{Above} Inviting interior of Daniel Greene Restaurant, Chicago.
{At right} This restaurant's modern "Magic Chef" equipped kitchen.

Photos courtesy Fenton-Kelsey Co.

MAGIC CHEF EQUIPS DANIEL GREENE'S EXOTIC CLEOPATRA-MOTIF RESTAURANT

● When Daniel Greene planned his now famous south-side Chicago restaurant, his one idea was to make it "the Talk of the Town." The Egyptian "Cleopatra" motif in three colors, red, green and blue, created a setting of barbaric splendor – attractive enough to draw patrons from every point in far-flung Chicago..... Came the problem of deciding on cooking equipment. On investigation, Mr. Greene found that *Magic Chef* heavy duty gas ranges cut cooking costs 30% to 48%*. Their streamlined design and convenient arrangement provided greater economy of space—which he needed. Insulated ovens promised 20° lower kitchen temperatures*.

(*Proven results from actual installations.)

And so, to Daniel Greene, came the logical answer to his problem—*Magic Chef*, of course. He installed three sections of the new *Magic Chef* heavy duty gas range – two of them of the hot-top variety with insulated ovens and automatic heat control; one skeleton unit; a broiler with radiant burners; and a Frialator. The economies effected, the splendid working conditions provided, and the excellent cooking results obtained from the *Magic Chef* have, Mr. Greene states, been largely responsible for the phenomenal success of this new restaurant.

Let our Magic Chef Heavy Duty Specialists demonstrate how restaurant managers on your lines can save time, money and worry with this ultra-modern gas equipment.

Magic Chef
AMERICAN STOVE COMPANY

BRANCHES IN PRINCIPAL MARKETS

Boston • New York • Atlanta • Cleveland • Chicago
St. Louis • Philadelphia • San Francisco • Los Angeles

AUTOMATIC HEAVY DUTY EQUIPMENT
Special Features

Red Wheel Lorain Oven Regulator
Cooking Top Heat Control
Automatic Top Burner Lighters
Automatic Safety Oven Pilot
Magic Chef Non-Clog Burners
Full Heavy Insulation

Gas Economy • Greater Speed
Greater Efficiency
Simplest to Operate
Easiest to Clean • Durability

COMPLETE AND FLEXIBLE LINE OF RANGES, BROILERS, ROASTERS, BAKERS

LOOK FOR THE RED WHEEL WHEN YOU BUY A MAGIC CHEF

We're Ringing

1
I guess I hinted about our old refrigerator . . . AND SANTA HEARD
This time I know our refrigerator will be PERMANENTLY SILENT because it's a Servel Electrolux—it freezes with NO MOVING PARTS
NEW 1936 SERVEL
SILENT as a floating bubble
SERVEL ELECTROLUX FREEZES WITHOUT NOISE, WITH NO MOVING PARTS
2
"I guess I hinted about our old refrigerator . . . AND SANTA HEARD!"
3
THREE WISE MEN and Their Wives
Mr. & Mrs. J. Hardy
137-42 Lake Ave.
New City, Utah
4
ANNOUNCING
Next years Refrigerator NOW
SEE THE NEW MODELS TODAY!
SERVEL ELECTROLUX
5
SERVEL ELECTROLUX
HERE'S WHY SERVEL ELECTROLUX IS DIFFERENT FROM ALL OTHERS
NO MOVING PARTS
This Means
THIS TINY GAS BURNER
READY NOW: THE NEW SERVEL ELECTROLUX
6
Silent Night . . . AND DAY
SERVEL ELECTROLUX
THE Gas REFRIGERATOR

TIE IN LOCALLY WITH THE DRAMATIC NATIONAL CAMPAIGN

THESE Xmas Bells

SO YOUR HOLIDAY SALES PARTY WILL BE

Bigger Than Ever!

CHRISTMAS is in the air already.

So we're pushing gas refrigeration right now. In time for the holidays. In time to help you score record winter sales with the new 1938 Servel Electrolux. Here's how you can profit most by this campaign:

- Put new models on display at once.
- Use the local newspaper advertisements and posters specially prepared for this Christmas.
- Send out literature about the new 1938 Servel Electrolux.
- Utilize the backs of gas bills for "reminder" advertisements.
- Organize your salesmen at once for an aggressive winter drive.

Servel, Inc., Servel Electrolux Sales Division, Evansville, Ind.

1 Two 4-color advertisements in "The Saturday Evening Post," one in "Good Housekeeping," and four pages in "Life"—that's Servel's magazine campaign during November and December. A total of 13,000,000 separate advertising messages to your prospects.

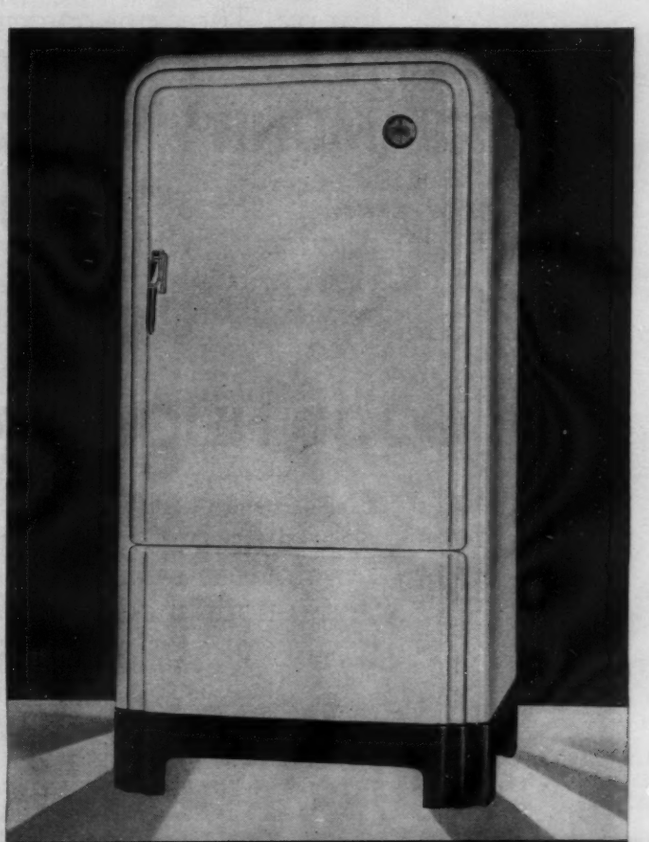
2 Here's a new envelope stuffer, in color, with the appealing title, "I guess I hinted about our old refrigerator . . . and Santa heard."

3 "Three Wise Men and Their Wives" is the title of this new 3-color broadside, which is perhaps the most interesting and comprehensive ever issued on Servel Electrolux.

4 To help you wage an aggressive campaign in your local newspapers, these striking display-type advertisements have been specially prepared and are available to you in mat form.

5 A new basic window display and a new trim designed for holiday displays.

6 "SILENT NIGHT—and day." That's the headline for the most arresting and appealing poster yet to feature Servel Electrolux.



SERVEL
ELECTROLUX
THE *Gas* REFRIGERATOR

"Community Chest agencies, through the years, have earned the right to public confidence . . ."
PRESIDENT ROOSEVELT

50,000,000 Americans in 10,000,000 Homes

assume community responsibility and enjoy individual privilege in making their unfortunate neighbors happy. They are co-partners in

400 COMMUNITY CHESTS

which, through annual appeals, finance about 8,500 agencies, who render Family Welfare, Child-Care, Health, Group Work and Delinquency-prevention service to millions of unfortunates.

BE A GOOD NEIGHBOR

Become a partner in this great work. The agencies are operating under heavy pressure and financial strain. Do not let selfishness compel reduction in diets of under-nourished children—or/and deny appeals for treatment at clinics and hospitals——

SUBSCRIBE GENEROUSLY TO YOUR COMMUNITY CHEST

"The Social Security Act will not relieve State or local community of one jot of social responsibility which it now carries"—KATHERINE LENROOT, Chief U. S. Children's Bureau.

Two Compressor Stations at Shamrock for Conservation

TO conserve gas in the Wheeler County field near Shamrock, Texas, two compressor stations are under construction by United Gas Pipe Line Co., Houston, and Lone Star Gas Co., Dallas.

United Gas Pipe Line Co.'s station is expected to be completed about December 1. It will consist of four units for a total capacity of 1200 hp. and will be operated at 350 lbs. It will send gas from the Shamrock field through the company's 16-in. transmission line running to Wichita Falls, Texas.

The main compressor building and the cottages of the attendants will be air conditioned as a safeguard against the Panhandle dust. The air will be filtered and washed as it enters the compressor station and pressure on the inside will be maintained at a differential of ½-in. The cottages will be equipped with individual air conditioning units.

Lone Star's 15-engine compressor station will start operating in December as a peak load station, but will be available for full-time operation when necessary. It will be a single stage plant, designed to handle a maximum capacity of 60,000,000 cu. ft. of gas a day. Seven 160-hp. Cooper engines are being moved to Shamrock from the Ibex compressor station, six from Caddo, one from Ranger, and another from Petrolia. These units are to be equipped with 6 X 20-in. stroke, Class-A compressor cylinders. Steel framework for the compressor building will be moved from the Ibex and Caddo plants.

■ ■

Wallace Is Vice-President of American Gas Products

W. T. Rasch, president of American Gas Products Corp., has announced the appointment of A. I. Wallace of Chicago to the position of vice-president. Mr. Wallace has been associated with American Gas Products Corp. for the past ten years. He entered the gas business thirty years ago. For twenty-five years he has been in the field of manufacturing gas equipment.

A. I. WALLACE

He has a wide acquaintance throughout the industry and will continue to make his headquarters in the Chicago office of American Gas Products Corp.

■ ■

A. G. A. Laboratories' Report Shows 12% Gain in Tests

The A. G. A. Laboratories closed its twelfth year of service to the gas industry with a record of testing (during the first 11 months) a total of 1,455 appliances and accessories—12 per cent more than were tested during the corresponding period last year. These and other facts about the Laboratories' work are published in the Twelfth Annual Report of the Laboratories Managing Committee.

With a staff of 62 at Cleveland and 9 at Los Angeles, the Laboratories are spending approximately $50,000 annually to conduct research studies assigned them by the Executive Board.

Forty-one new companies submitted initial equipment during the year. Unannounced factory inspection will be extended so that one or two unscheduled visits will be possible annually.

One of the most interesting accomplishments of the year in the field of requirements research, the report states, was the development of a form of inexpensive horizontal type draft diverter suitable for use on all types of vented gas appliances.

Five new sets of approval standards were prepared and printed, and five additional sets revised and mimeographed for submission to the American Standards Association.

■ ■

Accounting Center Opened by Consolidated Edison

An accounting center for the borough of Manhattan, said to be the largest public utility customers' accounting center in the world, was opened on September 7 by Consolidated Edison Co. of New York, Inc., at 111 East 16th Street, New York City. The center takes care of all commercial relations accounting work for 625,000 gas meters and 750,000 electric meters, handling a $100,000,000-a-year accounting business annually, covering yearly gas sales of more than 20,000,000,000 cu. ft. and 2,800,000,000 kw.hr. electricity sales.

The new center replaces four former units.

Combination billing to gas and electric customers has been started and the program will be completed during the winter. This will mean an estimated saving of 675,000 bills a month in Manhattan. Combination billing in the Bronx, where a commercial center was opened early in 1937, was completed in September.

One meter reader records the readings on both gas and electric meters and from there on the combination program has been carried through.

The telephone system installed for the Manhattan accounting center includes the largest automatic dial order turret ever installed for gas or electric service.

■ ■

Messer's Knoxville Natural Gas Franchise Out

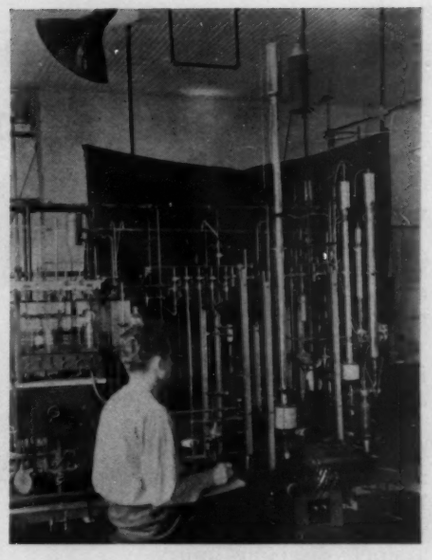
On the ground that William A. Messer, trustee, had "wholly failed to make a showing of his financial ability," and that the Knoxville Gas Co. is adequately serving the city, the Tennessee Utilities Commission denied the Messer application for approval of a natural gas franchise for Knoxville.

The Commission explained in its ruling that the petitioner had sought only a conditional franchise—a franchise conditioned on later proof of financial worth, and that he intentionally "did not on this first hearing sustain the burden of providing financial ability."

■ ■

To Build in Richmond, Texas

Texas Natural Gas Utilities plans construction of an office building at Richmond, Texas, to cost $7,500. The building will be air conditioned.



Gas analysis apparatus at the U. S. Petroleum Experiment Station, Bartlesville, Oklahoma

Dedicate U. S. Experiment Station Building

The new building of the Petroleum Experiment Station of the United States Bureau of Mines at Bartlesville, Okla., was dedicated on October 19 and 20, with high bureau officials from Washington, D. C., prominent persons in the oil and gas industries, Governor E. W. Marland of Oklahoma and others, participating in the ceremonies.

The station was founded at Bartlesville in 1917, and is the center of the Bureau's research activities on petroleum and natural gas. The new building was completed early this year. Its laboratories, which are on the upper floors, are designed and equipped for distillation of petroleum and for physical and chemical determinations on oils, gases, and oil-field waters.

■ ■

Purcell Smith Succeeds Green As Head of Middle West Corp.

Daniel C. Green, who has been president and director of Middle West Corp., Chicago, Ill., since it was formed in 1935, has resigned from both posts and leaves the company on December 1. He will head a new company, Central Service Corp., which will sell service and advice to public utility companies. Headquarters will be in Chicago.

Purcell L. Smith, vice-president in charge of finances for the Commonwealth Edison Co., has been elected a director and chairman of the board of Middle West Corp. He will take office on December 1.

■ ■

Yankton Gas Co. Sale Pends

Sale of the Yankton (S. D.) Gas Co. to South Dakota Public Service Co., Sioux City, Iowa, has practically been completed, and is awaiting only the winding up of a few details, according to K. D. Knoblock of American Service Co., Savanna, Ill.

Gas Company Winners in Safety Contest Listed

WINNERS in the annual Public Utilities Safety Contest were announced at the 26th National Safety Congress and Exposition in Kansas City, Mo.

Nine of the 148 companies entered in the competition went through the one-year period from July 1, 1936, to June 30, 1937, without a single disabling injury. The most outstanding no-accident record was made by the East Ohio Gas Co., Cleveland, which worked 1,555,351 man-hours without a single disabling injury.

During the contest year, 169,450 employees of the participating units worked 361,944,767 hours and experienced 3,774 injuries. All divisions averaged 10.427 disabling injuries per one million man-hours worked. Combination gas and electric companies had the lowest frequency rates by averaging 9.729 injuries per one million man-hours. Gas companies had the highest rates with an average of 11.490.

The number of companies enrolled and the number of hours of exposure were higher than for any previous contest. The competition is sponsored by the National Safety Council.

Bronze trophies were awarded to first place winners, and certificates were presented to companies placing second and third in each division. Where two or more contestants tied for first place in any group without a disabling injury, these perfect records resulted in equal rankings and awards.

Group A was composed of the largest organizations. Group B was made up of all those not qualifying in Group A.

Gas company winners are as follows:

GAS DIVISION, Group A: 1. Hope Natural Gas Co., Pittsburgh, Pa. 2. The Brooklyn Union Gas Co., Brooklyn, N. Y. 3. Columbia Gas & Electric Corp., Columbus, Ohio.

GAS DIVISION, Group B: 1. Dallas Gas Co., Dallas, Tex. 2. Pittsburgh & West Virginia Gas Co., Pittsburgh, Pa. 3. The Laclede Gas Light Co., St. Louis, Mo.

COMBINATION GAS AND ELECTRIC DIVISION, Group A: 1. Wisconsin Public Service Corp., Milwaukee, Wis. 2. Virginia Electric and Power Co., Richmond, Va. 3. Central Illinois Light Co., Peoria, Ill.

COMBINATION GAS AND ELECTRIC DIVISION, Group B: 1. Suburban Gas and Electric Co., Revere, Mass. 1. Moncton Electricity & Gas Co., Moncton, N. B., Can. 1. Wachusett Electric Co., Clinton, Mass.

Honorable mention certificates were awarded to the units, not trophy winners, having the greatest continuous man-hour exposure without a disabling injury during the period of the contest: The East Ohio Gas Co., Cleveland, Ohio; The Toledo Edison Co., Toledo, Ohio; Wisconsin Power & Light Co., Madison; Nebraska Power Company, Omaha, Neb.; Peoples & Columbia Natural Gas Companies, Pittsburgh, Pa.; Tide Water Power Co., Wilmington, N. C.

■ ■

A. B. ALLYNE

N. K. SENATOROFF

Allyne of Southern Counties Joins California Commission

ARTHUR B. ALLYNE, for the past ten years associated with the Southern Counties Gas Co., Los Angeles, Calif., as chemist, has received an appointment as associate engineer with the California Railroad Commission. Mr. Allyne will assume his new duties in San Francisco on November 8.

During his 10-year service in the gas industry, Mr. Allyne has played a prominent part in the activities of the Pacific Coast Gas Association. Joining the Association in 1928, he at once became an active committeeman. He has headed a number of the Association's committees and at the present time is chairman of the Technical Section. Mr. Allyne will continue to serve in this capacity during the coming Association year.

He has been investigator and author of papers on many technical subjects and has appeared as a frequent contributor to the columns of GAS. His work in various phases of natural gas engineering on such subjects as dehydration, internal corrosion, and pipe protection has afforded him a broad knowledge of the industry's technical problems.

Mr. Allyne received his degree from the California Institute of Technology in 1926 in chemical engineering and was associated with the Shell Oil Co. for one year prior to his affiliation with the Southern Counties Gas Co.

N. K. Senatoroff will succeed Mr. Allyne as chemist for Southern Counties. Mr. Senatoroff, immediately after he was graduated from California Institute of Technology in 1928, joined the staff of the Los Angeles Gas & Electric Co. In July of 1937 he became associated with Southern California Gas Co. In October he was appointed to Mr. Allyne's former post with Southern Counties. Mr. Senatoroff is active on committees in the Pacific Coast Gas Association.

■ ■

New Otis Field Development Looms for Industrial Use

Additional development of the Otis gas field of Rush and Barton counties in Kansas, the first natural gas area in the state to be prorated, is assured if plans materialize to form a new company to take 40,000,000 cu. ft. of gas daily from the field to supply industries in eastern Kansas and western Missouri.

Plans are already under way to organize the Kansas Industrial Gas Co., which would lay a 20-in. line from the field. LeRoy Burton, Wichita, Kan., representative of those interested in the project, wired from New York that P. J. Chapman and Co., bankers, had agreed to finance the new company.

As the line would supply only factories and other industrial enterprises, gas runs from the field would be the same throughout the year. Engineers have made a survey of the field and report that sufficient gas is available to supply the needs of the new company.

The September allowable for the field is only 354,997,000 cu. ft. under an order issued by the Kansas Corporation Commission, following a hearing on market demands. The 55 wells in the field have a potential of 1,520,154,000 cu. ft., and because some of the wells produce "sour" gas, connections have been made to only 30 wells by the five pipe lines now taking gas from the field.

■ ■

Two New Companies Acquire United's Gas-Oil Property

Acquisition by two newly formed companies of the gas and oil properties formerly owned by United Gas Public Service Co. and three subsidiaries, United Production Corp., Northern Texas Utilities Co. and Southern Gas Utilities, Inc., was announced recently by N. C. McGowen, president.

The new companies are Union Producing Co. and United Gas Pipe Line Co. Union Producing Co. has acquired all gas and oil producing properties of United Gas Public Service Co. and these subsidiaries, and all natural gas transmission facilities, including gasoline extraction plants, formerly owned by these companies have been acquired by United Gas Pipe Line Co.

Since all the functions previously performed by four companies will now be concentrated into the two new companies, the change represents a further step in the simplification of the corporate structure and operations, according to Mr. McGowen.

For Every Gas Control Requirement

THERE'S A

REYNOLDS REGULATOR

BRANCH OFFICES:

421 Dwight Building, Kansas City, Mo.

2nd Unit

Santa Fe Building, Dallas, Texas

REPRESENTATIVES:

Eastern Appliance Company, Boston, Mass.

Wm. A. Ehlers, East Orange, N. J.

For Forty-Five Years, REYNOLDS Gas Regulators have proved their ability in a field outstanding for its rigid requirements.

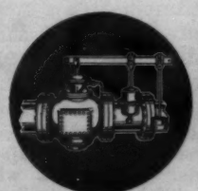
Proper regulation at the station, in line, in industrial plants, in the home—for every kind of type of pressure control equipment used in the gas industry, there is an especially designed product by Reynolds.

Reynolds has always maintained the lead in the development of gas control equipment that will give satisfactory control limits, capacity range and economic operation over a long period of time.

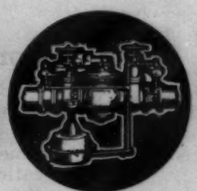
REYNOLDS GAS REGULATOR COMPANY

ANDERSON, INDIANA, U. S. A.

Recognized Gas Control Since 1892

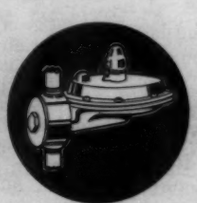


HIGH PRESSURE



DISTRICT STATION

INDUSTRIAL



SERVICE

LOW PRESSURE

RIGHT: The Palomar Ballroom—one of the nation's largest — was packed to capacity by those attending the cooking school.

LEFT: Demonstrations by appliance manufacturers staged in a huge tent leading to the ballroom entrance attracted throngs of spectators.

Los Angeles Companies Again Stage Mammoth Cooperative Cooking School

CO-OPERATIVE effort of Southern California gas appliance dealers and manufacturers, working with local gas companies and the *Los Angeles Examiner*, succeeded during September in making Prudence Penny's annual modern school of gas cookery the largest and most successful combination food and household appliance show and gas cookery demonstration ever produced in this section of the country. A series of similar schools was held in 1936.

It is estimated that 40,000 persons passed through the exhibit tent erected as an adjunct to the huge Palomar ballroom. Attendance at the Prudence Penny school approximated 20,000.

September 20, opening night of the gas appliance exhibit, was reserved for manufacturers of gas appliances, food representatives, gas appliance dealers, and employees of the gas companies. Here for the first time all popular makes of gas ranges, water heaters, and furnaces were exhibited under one roof in Los Angeles. Underneath the tent, said to be the largest west of the Pecos, was room for 143 booths.

The first Prudence Penny gas cookery school was held on the afternoon of September 21. Three additional schools, spiced with entertainment by popular radio and screen stars, were held on succeeding afternoons in the Palomar ballroom.

Nine thousand women attended the opening school, and the attendance during the rest of the week averaged well over 3500. In the evening, it is estimated that an average of 5000 people visited the tent, which was open until 10:00 at night.

■ ■

Sedan Gas Co. Buys Systems From Cedar Vale Company

The Sedan Gas Co., of Sedan, Kan., has purchased the Cedar Vale Gas & Fuel Corp. of Cedar Vale, Kan., and taken over operation of the gas distribution systems of Cedar Vale and Hewins, according to W. J. McNally, vice-president.

Gas is being distributed at high pressure in both communities, but the Sedan Gas Co. plans to change to low-pressure. In Cedar Vale, one high pressure line will be extended 3000 ft., Mr. McNally states, and a low pressure regulator installed at the end. Another low-pressure regulator will be installed in the south end of town. In Hewins one 2-in. low-pressure regulator will be installed.

The Sedan Gas Co. is a subsidiary of Central States Edison Co. of Newark, N. J. John Haddican is resident manager at Cedar Vale.

■ ■

Ohio Oil Co. Moves Plant

The Ohio Oil Co. is moving its absorption plant and compressor station from its present location at Venice, Calif., to a newly selected site in the El Segundo, Calif., field. Work has already begun, with Parkhill-Wade of Los Angeles in charge of the entire operation. Completion is scheduled for Nov. 30.

■ ■

Southern Union Display Wins

Southern Union Gas Co. won first prize at the Austin County Fair, Bellville, Texas, for its exhibit of gas appliances.

Requirements Committee Sets Tentative Range Rules

AT a meeting of the American Gas Association's Subcommittee on Approval Requirements for Domestic Gas Ranges, on September 24, several new requirements were tentatively adopted. These will be published and distributed for criticism early next year after other revisions to the range standards are completed.

To date, no requirement governing the efficiency of giant top burners has existed. At the recent meeting, one similar to that applied to regular burners was approved, except that a 9-inch rather than the standard 7½-inch pan is specified. Other rulings adopted require that the relative positions of oven burners and ignition pilots of automatic devices be fixed, and oven and broiler door springs must be easily accessible for repair and replacement, with the range in a normal position. Recommendations of the Association of Gas Appliance and Equipment Manufacturers relative to deletion of certain requirements were also considered.

The Subcommittee on Approval Requirements for Hotel and Restaurant Ranges met on September 25, and adopted at that time minimum thermal efficiency requirements for top sections of hot top and fry top ranges. These requirements are to be referred to the A.G.A. Approval Requirements Committee and, if accepted by that body, will become effective on January 1, 1938.

The Subcommittee on Listing Requirements for Automatic Main Gas-Control Valves suggested. at its September 30 meeting, that the Directory of Approved Gas Appliances and Listed Accessories include three listed capacities for automatic main gas-control valves to correspond with pressure drops of ¼, ½, and ¾ inch, respectively, provided this could be done without increasing listing costs to manufacturers.

■ ■

Portland Gas & Coke Co. Lays Line to Willamette

To increase the supply of gas to Willamette Valley, Oregon, Portland Gas and Coke Co. is laying 10,000 ft. of 10-in. high-pressure main along the Willamette River from a point near the east approach of the Ross Island Bridge to a point near Oaks Park, where it ties in with an under-water crossing and the main serving valley points. Capacity of the lines serving Salem and Hillsboro will be increased by 15 per cent when the new construction is completed.

Gas consumption in the Willamette Valley has increased 145 per cent since 1933.

■ ■

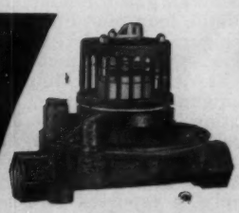
Continental Generating Plant

A gas-powered electric generating plant has been built by Continental Oil Co. near Moundridge, Kan., according to Emerson G. Smith, supervisor of publications. The plant, which consists of three 400-hp. Cooper-Bessemer Convertible Diesel engines with generators of 800-kw. capacity, will furnish current for pumping producing wells and drilling new wells in the Moundridge field. It will also furnish power for pipe line stations as well as power and light for cottage camps.

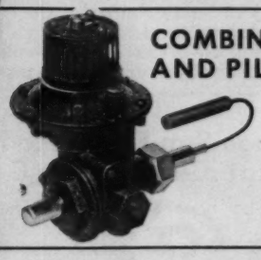
NOW YOU CAN STANDARDIZE ON SNAP-ACTING CONTROLS FOR UNIT HEATERS SPACE HEATERS AND COMPLETE CENTRAL SYSTEMS

If you want to build into your heaters controls that are economical, easy to install, simple to service — controls that have no delicate parts to wear out and give you trouble — then specify *Klixon Controls.* Different from others, Klixon controls — whether gas or electric — are operated by the Spencer disc — a simple, compact thermostatic disc that does away with such devices as toggles, bellows, magnets — a sturdy, dependable vibration-proof disc of bi-metal that snaps "on" or "off" *instantly* without hesitation or fluttering, at your desired control temperatures.

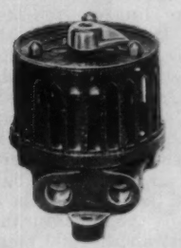
Manufacturers, salesmen and servicemen are demanding Klixon controls. Now with the complete Klixon line — operated by the Spencer disc — it is possible to provide, for all types of heaters, snap-acting, cost-cutting control.



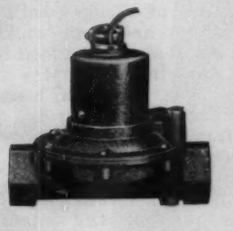
GAS-ACTUATED TEMPERATURE CONTROL UNIT Here is an economical gas-actuated control unit for such gas space heating appliances as space heaters, radiators, floor furnaces, circulators, range burners, and garage heaters. It consists of a Klixon gas-actuated thermostat mounted directly on the main diaphragm valve. Complete unit is easily installed close beside the heater.



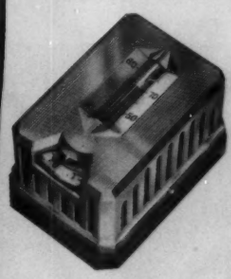
COMBINATION TEMPERATURE CONTROL AND PILOT SHUT-OFF VALVE This complete simple unit gives you all the advantages of the control unit above, and in addition assures positive protection against continued flow of gas should pilot go out. Manual resetting of burner is required. Complete unit is easy to install. The cost is low.



REMOTE GAS CONTROL FOR GAS HEATERS All Klixon diaphragm valves can be operated remotely by a Klixon gas-actuated thermostat mounted at any convenient spot. The complete operation is by gas. No wiring. Gas tubing from thermostat to diaphragm valve is either over the surface or concealed. Complete installation is simple. Low cost and de luxe types available.



REMOTE ELECTRIC CONTROL FOR GAS HEATERS With this new Klixon electrically operated gas valve, it is possible to control gas heaters remotely by means of Klixon electric thermostats. And with this valve you get no hum or flutter. For it is thermally operated by the Spencer disc and has an operating time delay of 30 seconds. A simple, dependable, and economical unit for all types of installations.



ELECTRIC ROOM THERMOSTATS FOR HEATING AND COOLING These compact, attractive, KLIXON electric Thermostats are snap-acting, dustproof, sensitive. They can be supplied for either heating or cooling or both. Given a precision setting at the factory they retain their adjustment permanently. Any desired temperature is set by the calibrated dial at the bottom of the thermostat. An operating differential of ¾° F. plus or minus insures a straightline room temperature.

OTHER KLIXON CONTROLS In addition to the above controls, Klixon offers you disc-operated gas thermostats for hot water heaters, a number of different pilot shut-off valves, unit heater gas switches, temperature and pressure relief valves for hot water heaters, pilot burners and many others. Send for new complete catalog.

SPENCER THERMOSTAT CO., Forest St., Attleboro, Mass.
Gentlemen:
Send me without obligation your new complete catalog.

MR.....POSITION.....
FIRM.....
ADDRESS.....
.....

SPENCER THERMOSTAT CO.
ATTLEBORO MASSACHUSETTS

Northern Indiana Changeover Under Way at Fort Wayne

CHANGEOVER from 570 B.t.u. manufactured gas to 1000 B.t.u. natural gas has been completed in Bluffton and Decatur, Ind., by Northern Indiana Public Service Co., as the first part of a program which calls for changeover in Fort Wayne and nine other towns in the Fort Wayne system of the company.

Changeover in Fort Wayne was to start on October 25, according to Donald Hoover, advertising manager of Northern Indiana Public Service Company, with work for some of the large industrial customers being undertaken before that time.

T. J. Kelly, division manager at Fort Wayne, is in charge of the changeover. C. B. Farrell is supervising the crew of 300 engaged in the work.

A feature of the advertising program carried on by the utility in connection with the change to natural gas is an intensive campaign on home heating. It is based on the slogan: "You can afford to heat your home with gas now that rates have been reduced one-third."

All communities affected have approved the change, and the Public Service Commission has approved the change and the rates to be charged.

■ ■

End Hearings on Washtenaw Natural Gas Application

Hearings on the petition of Washtenaw Gas Co., Ann Arbor, Mich., for permission to supply natural gas to Ann Arbor by tapping the Texas gas line to Detroit were concluded on October 8. Briefs were then presented by Washtenaw Company attorneys, and by Independent Natural Gas Producers Association of Michigan, which opposed the Washtenaw application on the ground that there is sufficient gas supply in Michigan to care for local demand.

During the proceedings, which have extended over several months, advocates of "Michigan gas for Michigan" proposed a 400-mile loop pipe line which would take Michigan natural gas from the Six Lakes, Broomfield, and New Haven areas to at least nine important southern Michigan communities, including Flint, Pontiac, Ann Arbor, Jackson, Battle Creek, Kalamazoo, Allegan, Holland, and Grand Haven.

All available Michigan natural gas supply is reported to be contracted for by Consumers Power Co. and Grand Rapids Gas Light Co. If the loop line project materialized, the independent producers would have to go through the courts to break existing contracts, it is said by observers of the case.

■ ■

Huge San Francisco Furniture Mart Kitchen Uses Gas

The new $3,000,000 Western Furniture Exchange and Merchandise Mart in San Francisco, Calif., the largest mercantile building erected west of Chicago since pre-depression days, uses gas in the kitchen from which dining rooms seating 800 persons are served.

A new, streamlined Wedgewood heavy duty two-section restaurant range, Model 722, manufactured by James Graham Manufacturing Co., with No. 20C Wedgewood two-oven bake oven, has been installed. With this equipment the owner of the restaurant concession turned out about 1500 meals in one day, and on the first day served nearly 900 persons for lunch. (See picture below).

Features of Wedgewood's new restaurant ranges are large cooking capacity in the small space occupied by the range, glass wool insulation 4½ inches thick, bottom oven plates of heavy cast iron, and thermostatic controls on ovens. The manufacturer offers 26 range-top combinations. The new Hot Top can be had in sections 12 in. wide, making the cooking top arrangement exceedingly flexible, the company points out.

A number of these restaurant ranges have been installed in the Los Angeles schools and in hospitals.

Wedgewood equipment in the kitchen of the San Francisco Furniture Mart.

University Appoints Carson Engineering College Dean

WILLIAM HENRY CARSON, director of the schools of mechanical and natural gas engineering and acting director of the school of petroleum engineering at the University of Oklahoma, Norman, has been named dean of the college of engineering, according to an announcement by President W. B. Bizzell.

W. H. CARSON

Mr. Carson holds the B. S. and M. E. degrees in mechanical engineering from the University of Wisconsin. Some of the positions which he has held and the companies with which he has been associated are: engineering department, Nordberg Manufacturing Co., Milwaukee; oil field engineer, Whealton and Townsend Co., Tulsa; research engineer, American Radiator Co.; research engineer, Lucey Boiler and Manufacturing Co. In the summer of 1930 he served as a research engineer in oil well drilling equipment for the American Society of Mechanical Engineers.

Dean Carson has for several years served as director for the annual Gas Measurement Short Course which annually attracts more than 600 delegates from nearly every state in the union.

■ ■

P. C. G. A. Fall Conference Set for December 15-16

The fall conference of the Pacific Coast Gas Association will be held December 15 and 16 at the Fairmont Hotel in San Francisco, Calif.

A. J. Noia of the Pacific Gas and Electric Co., chairman of the Association's Educational Committee, will be chairman of arrangements for the program.

Norbert O. Fratt, general chairman of the Sales and Advertising Section, has announced the following appointments:

H. W. Edmund, Coast Counties Gas and Electric Co., chairman of the Domestic Sales committee; E. H. Adler, San Diego Consolidated Gas and Electric Co., chairman of the Industrial Sales committee; Ruth Kruger, Central Arizona Light and Power Co., chairman of the Home Service committee; Homer Laughlin, Southern California Gas Co., chairman of the Advertising committee.

R. I. Snyder, chairman of the Utilization Committee Technical Section, has appointed C. A. Renz of the Southern California Gas Co. to the chairmanship of the subcommittee to make a study of the methods being employed by gas companies in making field inspections of gas appliances.

■ ■

C. B. Boulet Heads Safety Men

C. B. Boulet, safety director, Wisconsin Public Service Corp., Milwaukee, was elected national chairman of the American Society of Safety Engineers at the annual meeting held in connection with the National Safety Congress, Kansas City, Mo.

COMMITTEE
A. C. JOY, (P. G. & E.)
Chairman
FORREST RAYMOND
(San Diego Cons.
G. & E. Co.)

COOPERATIVE LOAD BUILDING
P. C. G. A.
BULLETINS

COMMITTEE
J. S. SPAULDING
(So. Calif. Gas Co.)
CLIFFORD JOHNSTONE
Managing Director
Pacific Coast Gas
Association

Making Friends for Gas
THE MODERN FUEL

Upper right—All-gas home featured in architectural and building publications. ☆ *Below*—A leading dry cleaner testifies in favor of gas fuel. ☆ *Lower right*—"Gas is better," says this commercial baker. ☆ Typical trade journal ads, 1937 series.

All Gas
THIS unique Pasadena home for Miss Jeannette M. Drake, by Architect Edgar Bonnetz, A. I. A., of Los Angeles, reflects the Oriental influence in design and landscaping for which America inspired its many fea-

ANOTHER GAS BOOSTER

PIONEER
DRY CLEANER
Endorses
"The
Modern
Fuel"
The "G. F." Thomas Cleaners, San Francisco, with a reputation for quality work and dependable service since 1884, enthusiastically recommends gas fuel.
● "The cleanliness of gas," says Mr. Thomas, "is of course important to the cleaning business. Even more desirable is its economy, helping us to hold down costs without starting service. Control is automatic. We need scarcely give our steam plant a thought."
● Steam for all purposes is supplied by a 10 h. p. gas-fired boiler, with complete automatic fuel and water regulation.
Are you enjoying the special advantages of "The Modern Fuel"? If convinced that it would give you better results at lower cost, wouldn't you change to gas? Facts and figures are quickly available. Telephone or write Your Gas Company
Gas
THE MODERN FUEL
QUICK CLEAN CONTROLLABLE DEPENDABLE ECONOM

10 YEARS'
ACE SPEAKS
"... GAS IS BETTER"
"Gas is recognized throughout the baking industry as the superior fuel for quality and uniform production." ☆ So says Carlos S. Pettering, superintendent of the big OLSON'S BAKING CO. plant, Los Angeles, owned by Fred G. Olson. ☆ Gas-fired for 16 years, the bakery has a new gas steam boiler, and both tray and tunnel-type traveling gas ovens, with automatic control. ☆ Modern gas equipment will save and make money in your plant, large or small. Consult your Gas Company's baking specialists without charge.
Gas
THE MODERN FUEL
QUICK • CLEAN • CONTROLLABLE • DEPENDABLE • ECONO

SALES SLANTS

A month by month presentation of experiences on the sales front.

Salesman, "You're Wrong" Prospect, "So Long!"

IT is pretty generally agreed among salesmen that one of the most damaging phrases they could have in their sales vocabulary is "you're wrong."

It is a phrase that a salesman is sometimes inclined to use when the prospect voices opposition to some point he is attempting to make. The smart salesman learns to control that impulse and resort to the more subtle strategy of "you're right, but . . . "

The process of changing a person's mind involves teaching, showing, demonstrating, explaining. But if you want to stop the process dead in its tracks, tell the person you are trying to influence that he is wrong.

There is nothing more important to a person than himself, what he thinks, feels, and does. To tell him bluntly that he is wrong inflicts an injury to his pride.

For instance, if a prospect is told he is wrong when he ventures to say that his old range may not look pretty but that it gives as good service as he could expect from any range, that prospect will defend his statement with every argument he can command. It is not the idea that is important to him. It is his pride.

Because it is his pride—and not the idea—that the prospect is defending, a salesman accomplishes nothing by proving the prospect is wrong. Worse still, he widens the breach, because the prospect was not permitted to overcome the imputation to his self-esteem.

To change a person's mind—that is, make a sale—one must not arouse emotional resistance. A person buys to satisfy a need. If a prospect offers resistance to any point made about the desirability of a modern gas appliance, he does so because he has not understood the point in terms of his need.

According to the consensus of experienced salesmen, whenever the need is clearly adapted to the appliance to be sold, the prospect will seldom find good reason to take issue with the salesman. If the prospect should do so, it is the salesman who is in the wrong rather than the prospect, because the salesman has failed to make a clear adaptation of the need to the gas appliance he is trying to sell.

Cooking, Canning, and Styles Draw Oregon City Crowds

Capacity crowds of 800 persons, mostly housewives, attended Portland Gas & Coke Co.'s style show and gas cooking and canning conference in Oregon City on the nights of September 15 and 16.

The affair was under the direction of C. W. Nash, manager of the Oregon City district, who secured the active support of ten local merchants and several manufacturers, all of whom contributed door prizes, entertainment, and advertising. Master of ceremonies was Robert B. Elliott, sales promotion manager for Portland Gas & Coke Co.

Valuable information for the gas company was obtained in the form of tickets for door prizes which not only gave the names of all who attended, but the kind of cooking equipment they were using as well. The part of the ticket retained by the guest entitled her to $5 on the purchase of any gas equipment at $50 or more from the gas company or any of the participating appliance dealers.

■ ■

Home Service Started, Topeka

The Gas Service Co., Topeka, Kan., has opened a home service department, according to George Wells, sales manager. Miss Pauline Watson, graduate of Iowa State College and formerly food supervisor for a Kansas City cafeteria, has been appointed head of the department.

Guiding the Housewife Into Selecting a Modern Range

OUR health depends to a large extent upon the quality and wholesomeness of the food we eat. Because the nutritious value of food is affected so much by the appliance we use to prepare it, the best appliance possible for the kitchen is none too good.

It is obvious, therefore, that the housewife, although she herself may not be aware of it, should have the highest quality gas appliance that she can afford to own.

The gas appliance merchant is in a position to influence toward the higher quality upwards of 95 per cent of the women buyers of new gas ranges who come into his store to make a purchase. That's what a survey showed that was conducted in a midwestern city among 282 housewives who were recent buyers of gas ranges.

The survey showed that 51.7 per cent of the homemakers decided to buy as a matter of immediate necessity; their old ranges had become virtually useless or were falling apart. These homemakers did not buy because of any strong conviction that a superior gas range would greatly improve their home life and were probably unaware that there were any important distinctions to be made in the quality of gas ranges. Another large group, or 45 per cent, decided to buy solely because they were attracted by the beauty of the new gas range which they had seen on display. It was only after they had put their new gas range into use that they learned of its superior performance. In fact, only 3.2 per cent of the buyers had any definite knowledge beforehand of what the modern gas range would do in the matter of bettering their home life.

While these figures may not apply generally, they will approximate the situation in most towns. Therefore, the housewife, because of her meager advance knowledge, is highly susceptible to be influenced and the gas ap-

pliance merchant is in a position to guide her selection. He can, by a careful presentation of all the facts, persuade a greater number of homemakers to choose that which they should have, namely, the best quality gas range they can afford to buy.

Generally, a housewife left to her own choosing could not be expected to buy the higher priced range since she would have no knowledge of what it would mean to her. Under these conditions, it would be only natural that she choose the lower quality.

Tell the facts, and all the facts to every prospect for the modern gas range. The results will be reflected by an increased unit sale, bigger profits, and better satisfied customers.

■ ■

Edmonton Utility Entertains Women's Organizations

By opening its demonstration kitchens to women's organizations, Northwestern Utilities Co. of Edmonton, Canada, has made many new friends for the company and won old customers to closer friendship. According to the plan explained by Kathleen Esch, a home service demonstration is first presented, then the guests play bridge or games, and finally light refreshments are served by the company. The utility also furnishes the card tables, cards, and score pads.

A club makes any charge it wishes, and handles all money received.

In two months, 32 demonstrations were given before organizations. There was little duplication of attendance, according to Miss Esch, and the company thus reached 2,880 women. The cost was about 10 cents a person.

■ ■

Laclede's Display Covers 5,600 Sq. Ft. at Show

Laclede Gas Light Co., St. Louis, Mo., occupied 5,600 sq. ft. of floor space at the National Home Show in the Municipal Auditorium. Twenty exhibitors, in co-operation with George H. Schlatter, general sales manager, displayed 130 gas appliances, making the exhibit one of the largest gas appliance displays ever held outside a convention of the American Gas Association.

A feature of the show was a full-size gas-equipped house, built in a real garden, with growing trees, shrubs, and flowers.

The home service department conducted a cooking demonstration every afternoon. Free tickets to the demonstrations were distributed to St. Louis homes by bill carriers.

■ ■

Heater Drive in San Diego

Gas space heaters are featured in a three-months sales campaign which was started on October 1 by San Diego (Calif.) Consolidated Gas Co. In addition to an extensive newspaper advertising campaign, a radio program is broadcast on Tuesday and Friday at 8:15 p.m. over KGB.

A Superior Sales Manager Can Never Be Satisfied

WHEN can a sales manager be said to have done a thorough job? If you are pretty well satisfied with what you are now doing to get sales, read the opinion of this man who finds no limit to what a sales manager can do to boost volume. Here it is:

"The sales manager who sees to it that his men are carefully instructed in selling principles at regular sales meetings, who insists upon a minimum number of calls to be made by his men each day, and who backs up his men in the field with consistent newspaper advertising is to be commended for a pretty thorough job.

"But however thorough his job may seem, there's always just a little more that he can do. And often it is the difference between a fair volume and a good volume.

"For instance, in my opinion, very few sales managers use the mails as much as they should. On the average, it takes about three calls to close a gas appliance sale. Those calls may be spaced at intervals of from one day to several weeks. It is a smart sales manager who provides a letter or better still, a series of letters which the salesman can address and mail to his prospects between calls.

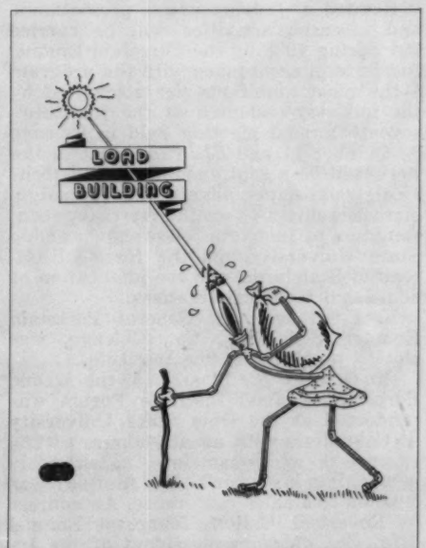
"Such letters giving another reason for buying gas appliances, and further stressing their desirability, help maneuver prospects into receptive moods, with the result that a salesman's chances of closing are materially increased.

"Follow-up letters are not costly because they can be standardized and prepared in quantities with only the date and prospect's name to be added. And the postage is negligible compared to the probable results. In fact, it is, in my opinion, about the cheapest form of promotion a sales manager can use.

"Using satisfied customers to get leads is a strategy nearly every aggressive sales manager employs. But why stop with just leads? A satisfied customer can be far more valuable A customer who will furnish leads will also sign a letter expressing her satisfaction with the appliance.

"Such letters in a salesman's portfolio are not only conclusive proof of the satisfactory service gas appliances render, but they help stir the emotions of a prospect who is anxious to keep her living standards as high as those of her neighbors.

"In nine cases out of ten, the sales manager who reaches a point where he is reasonably well satisfied with what he is doing has begun to slip."



Soon after her birth, Lotta Hotta was put to hard, manual labor.

■ ■

Lotta Hotta Joins San Diego Utility Sales Staff

And now, ladies and gentlemen, we present Lotta Hotta! She's the pet of the gas departments of the San Diego (Calif.) Consolidated Gas & Electric Co., who insisted that Reddy Kilowatt of the company's electrical department needed a playmate. Lotta is a gas pipe-dream, according to *The News-Meter*, "and a natural if there ever was one. Her body is a gas pipe, her neck a burner, her head a flame, and her abbreviated skirt a circular recording chart from a gas pressure gage. The gal is Hot Stuff, except when she presides with cool dignity over that most silent of all mechanical refrigerators, the Electrolux."

According to Forrest M. Raymond, superintendent of advertising, Lotta Hotta is not a public character but only a departmental pal who has contributed largely to a more friendly relationship between both gas and electric departments.

Ted Rockwell of the record department is the artist who gave Lotta her face and figure. He credits Vivian Kirkpatrick with inspiring him to create this light-headed charmer.

California Appliance Group Peps Up Sales Activities

STARTING the fall season with a gas range campaign, the Gas Appliance Society of California is following immediately with a gas circulating heater campaign in November.

Slogan of the range campaign was, "Tune Up Your Kitchen with a 1938 Gas Range!" The campaign continued from October 2 to 9.

Special offer for the week was a $10 saving offered to the purchaser of a new, current model gas range bearing a Society sticker, according to the regulations of the campaign. The offer applied on the sixteen leading makes of gas ranges, installed on the lines of Pacific Gas and Electric Co. or San Joaquin Light and Power Corp.

Newspaper advertising was carried by these two companies in more than 200 daily and weekly newspapers. Newspapers were offered publicity clip sheets and free mat service, as is usual in Appliance Society campaigns.

An effective poster used during the California society's Fall Range Drive.

Because of the outstanding success of the radio advertising in previous campaigns, the fall campaign included 559 spot announcements over 22 stations, using both transcriptions and straight announcements. In addition, Pacific Gas and Electric Co. devoted the commercial announcements in its popular "California Tales" radio program to the campaign theme and special offer.

A $42,000 campaign on gas circulating heaters will be conducted by the Gas Appliance Society of California during November.

Pacific Gas and Electric Co. is offering dealers, among other things, a $6.75 thermostat free to give each customer to whom he sells an A.G.A. approved gas circulating heater having the required capacity.

In order to encourage dealers to display a working demonstrator on their floors, they are also offered $12.50 to be used for gas piping necessary to connect a gas circulating heater on the display floor.

The Gas Appliance Society is backing up this unusually extensive campaign with radio spot announcements on approximately 20 stations, publicity releases to newspapers, free mat service on circulating heaters, and complete informative service for dealers and newspapers.

■ ■

Porcelain Institute Expands Program for 1938

Expanded advertising, promotional, and research activities will be carried out during 1938 by the Porcelain Enamel Institute in accordance with the program —the most ambitious yet attempted by the industry—adopted at the Institute's seventh annual meeting held in Chicago on October 11 and 12. Prominent in the work will be a continued trade and technical trade paper advertising campaign, increased direct-by-mail advertising, continuation of Institute fellowships at Ohio State University and the National Bureau of Standards, and the publication of additional technical treatises.

F. E. Hodek, Jr., General Porcelain Enameling & Mfg. Co., Chicago, was elected president of the Institute.

On October 13, 14 and 15, the second Porcelain Enamel Institute Forum was conducted at the Ohio State University in Columbus, with an attendance of 230 executives and enamelers, considerably larger than last year's. The first day was devoted to a sales conference. An address by Robert G. Calton, Tennessee Enamel Mfg. Co., outgoing president of the Institute, and various other addresses and reports featured the remainder of the Forum.

A.G.A. Announces Winners In "On To Cleveland" Drive

WINNERS in the American Gas Association's gas range sales contest were announced shortly before the annual convention in Cleveland. All-expense trips to the Cleveland meeting were awarded to the ten highest contestants in the natural gas group, and to the ten highest in the manufactured gas group. Winners in the natural gas division were as follows:

C. E. Brown, Oklahoma Natural Gas Co., Tulsa, Okla.; P. Coe, M. O'Neil Co., Akron, Ohio; Jack Elliott, River Valley Gas Co., Ozark, Ark.; Paul Groce, Montgomery Ward & Co., Shawnee, Okla.; O. P. Jones, Peoples Gas Co., Port Arthur, Texas; H. L. Lackey, Kansas City Gas Co., Kansas City, Mo.; Leo Mayer, Montana-Dakota Utilities Co., Minneapolis, Minn.; J. L. Robbins, Sears, Roebuck & Co., Cincinnati, Ohio; W. B. Robinson, Oklahoma Natural Gas Co., Oklahoma City; L. T. Shelton, River Valley Gas Co., Paris, Ark.

Honorable mention certificates were awarded to the 50 runner-ups in both the manufactured and natural gas groups.

■ ■

Lone Star Contest Calls For Home Heating Pictures

A photograph contest in which Lone Star Gas System is buying 100 winning pictures at $10 a picture is stirring interest throughout the extensive Texas territory served by Lone Star companies. The pictures wanted are those illustrating various types of gas heating equipment used in homes in the territory.

The company is buying the ten best pictures entered in the contest each week. At the end of the ten-weeks period, grand prizes of $100, $75, $50, and $25 will be awarded for the four best pictures of the entire contest.

The contest is open to anyone living in a home supplied by gas by any of the Lone Star Gas System companies, except professional photographers and company employees and their families.

The companies expect to use the pictures to show prospective customers how an appliance will look when actually installed in a home.

■ ■

Check Municipal Service in Appliance Merchandising

Last month the city council of Glendale, Calif., took action indicating it would order the Municipal Service Department to discontinue the sale of electric ranges in competition with private enterprise. Appliance dealers had threatened to circulate petitions for a special election to decide the issue.

■ ■

Girl Scouts Bring Publicity

Generous publicity came to The Hartford (Conn.) Gas Co. when a troop of Girl Scouts baked a birthday cake in the gas company's kitchen for Governor Cross. Twenty-five Girl Scouts from various parts of the state took part in the presentation.

UNITED INDUSTRY CAMPAIGN

featuring

Gas Circulating Heaters

with **FREE** *thermostat*

EVERYWHERE **P. G. and E.** SELLS GAS

Nov. 1-30 Watch for Gas Appliance Society

OFFICIAL BULLETIN

G 211—1137

George Hargrave, sales supervisor, watches John Little demonstrate use of the dreaded crying towel.

Dallas Gas Co. Men Weep For Sales That Get Away

A crying towel—that's right!—into which salesmen may weep their stories of lost deals is proving an effective spur to renewed efforts on the part of the sales staff of the Dallas (Texas) Gas Co.

The towel is of cotton, and on it is embroidered in red thread a sad face and the words: "Crying Towel for Lost Deals." When a salesman begins to make excuses for a lost sale, George Hargrave, sales supervisor, interrupts long enough to tie the towel around the shoulders of the alibier, then tells him to proceed with his story and that he has the sympathy of the others present.

■ ■

Nearly Two Million Call For Mystery Chef Cook Book

In the 22 months since the Mystery Chef went on the air as the Gospeleer for Gas, 1,630,000 copies of his book entitled, "Be an Artist at the Gas Range," have been called for in person at the offices of gas companies, according to information from the American Gas Association. Demand during the last two months was double that of the same period a year ago.

This cooperative advertising program started December 1, 1935, with 85 Eastern companies participating through 13 stations of the National Broadcasting Co. Today 100 companies use the program—among them 91 Eastern companies and 9 from the Pacific Coast, utilizing 14 broadcasting stations in the East and five in the far West. About twenty additional companies are using electrical transcriptions.

Meters of gas and gas-and-electric companies participating in the "live" broadcast have increased to 6,181,185 from 4,738,747 at the beginning of the program.

Equipping Classroom Kitchens Subject of A. G. A. Book

"Modern Kitchens for Homemaking Instruction" is the title of a new booklet available from the American Gas Association. Its subject is that of equipment in food laboratories in public schools and colleges, and it was prepared by the 1937 Home Service Committee to meet inquiries of home service directors and company salesmen on methods of meeting school requests for modernization.

The book has 25 illustrations and chapters covering arrangement and selection of gas and other fundamental equipment, and suggested instruction to students on the use of gas appliances.

The price is 15 cents a single copy; 10 cents a copy if ordered in lots of 25 or more.

■ ■

Commercial and Industrial Gas Sales Hit Peak

Gas fuel consumed in industry and commerce today is at an all-time peak and considerably above the pre-depression years, according to statistics released by the American Gas Association. For the 12 months ending June, 1937, the consumption of industrial and commercial gas (both natural and manufactured) amounted to 1,065,030,900,000 cu. ft., a gain of 16 per cent over the preceding 12-months' period. The gas consumption curve shows an uninterrupted ascent since 1932, the low point in the depression.

■ ■

E. E. McCormick of Peoples Natural Gas Co. Dies

E. Ellsworth McCormick, sales manager of Peoples Natural Gas Co., Pittsburgh, Pa., died from heart disease on October 7 in Perrysville, Pa. Mr. McCormick joined the sales organization of Peoples Natural Gas Co. in 1925, and in 1930 he was appointed sales manager.

A successor to Mr. McCormick has not yet been appointed, according to E. W. Williamson, manager.

■ ■

So. Cal. Gas Co. Open House

Open house at the Glendale office of Southern California Gas Co. on October 9 marked the completion of an extensive modernization job on the headquarters of the gas company's northern division. During the afternoon customers and friends of the industry toured the building. In the evening, a program of entertainment was followed by a brief ceremony of dedication. S. C. Singer, manager of the northern division, acted as master of ceremonies.

■ ■

Roy Black Joins Knoxville

H. Roy Black, formerly sales manager of the Washington County Gas Co., Johnson City, Tenn., has been appointed commercial and industrial engineer for the Knoxville (Tenn.) Gas Co., according to anouncement by H. G. Bonner, general manager, and C. W. Gale, sales manager. Mr. Black has been in the utility field since 1915.

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. **Gas cannot pass.**

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
475 Eleventh Street
San Francisco, California

SAFETY FIRST!!

METALBESTOS GAS VENT AND FLUE PIPE

Is Now Approved and Listed Under the Re-Examination Service of

UNDERWRITERS' LABORATORIES INC.

All pipe and fittings hereafter leaving our factory will bear the prescribed marking of the UNDERWRITERS' which will be your assurance of SAFETY, UNIFORMITY and DURABILITY.

Manufactured with Pardonable Pride by

WILLIAMS-WALLACE COMPANY

160 HOOPER STREET SAN FRANCISCO, CALIF.

From LARGEST to SMALLEST

Pacific Makes the Most Complete Line of Gas Heating Appliances

For every industrial, commercial and residential heating requirement . . . for every climate from sub-arctic to sub-tropical . . . for natural or butane gas, there's a Pacific gas heating appliance that will give greater satisfaction and show a lower operating cost. Pacific pioneering is responsible for many outstanding developments in gas heating, including the Pacific Safety Pilot and the Multi-Tubular Burner. Depend on Pacific appliances to build your winter load. Write for catalog G11.

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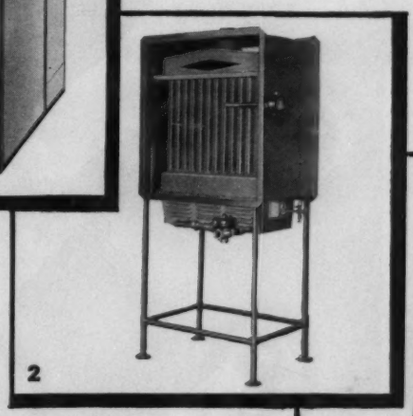
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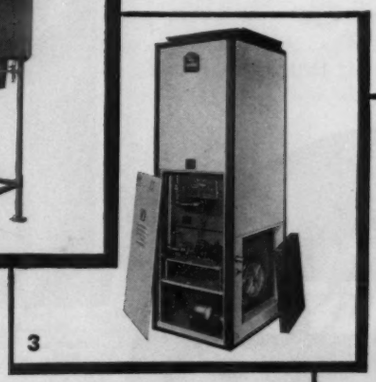
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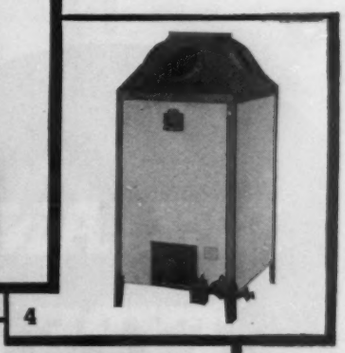
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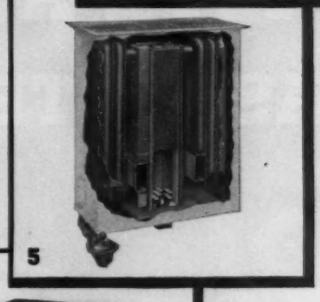
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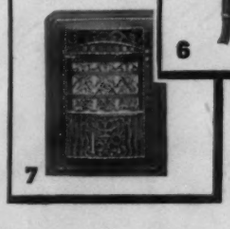
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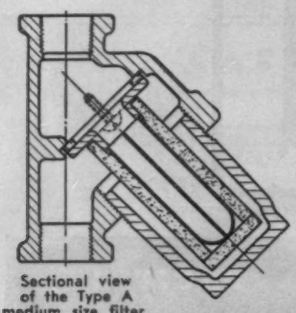
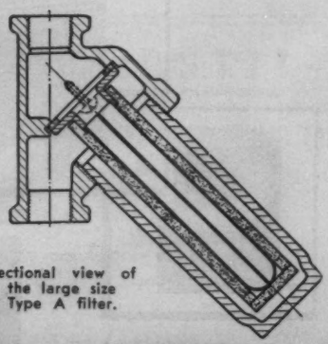


Sectional view of the Type A medium size filter.



Sectional view of the large size Type A filter.

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Send for Bulletin No. 35

RELIANCE REGULATOR CORPORATION
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RELIANCE REGULATORS

MEASUREMENT and CONTROL

A Device for Obtaining Average Gas Samples over Long Day Intervals

By JAMES L. BURKE Assistant Superintendent of Measurement
Houston Pipe Line Company

IN ORDER to determine the average calorific value over a given period of time of the gas being delivered to a customer, the device illustrated below was designed for obtaining a sample representative of the gas delivered during the elapsed time. It operates on the principle of critical flow, thus obviating the use of positive displacement of water in gathering the sample, which is undesirable if the gas contains any constituents soluble in water such as CO_2.

This device consists essentially of a cylindrical pressure vessel equipped with a recording pressure gage; two adjustable orifices and a by-pass on the up-stream side; and two outlets on the down-stream side, one to the calorimeter and gravity balance and the other a vent to atmosphere.

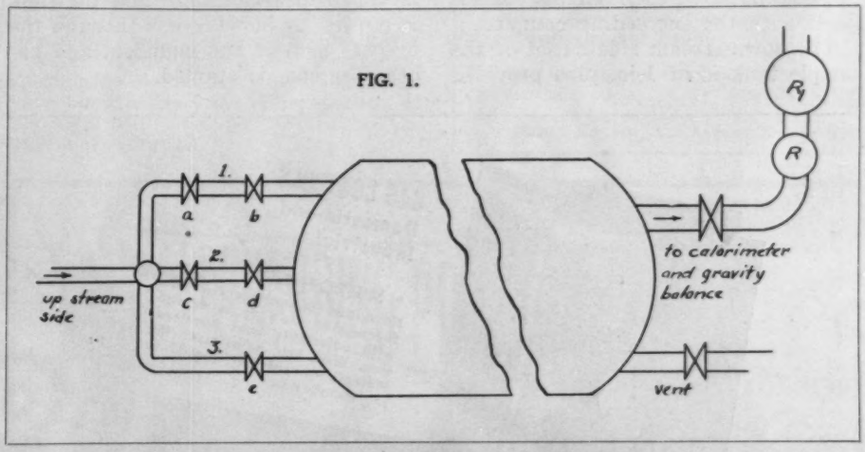
The Device Illustrated

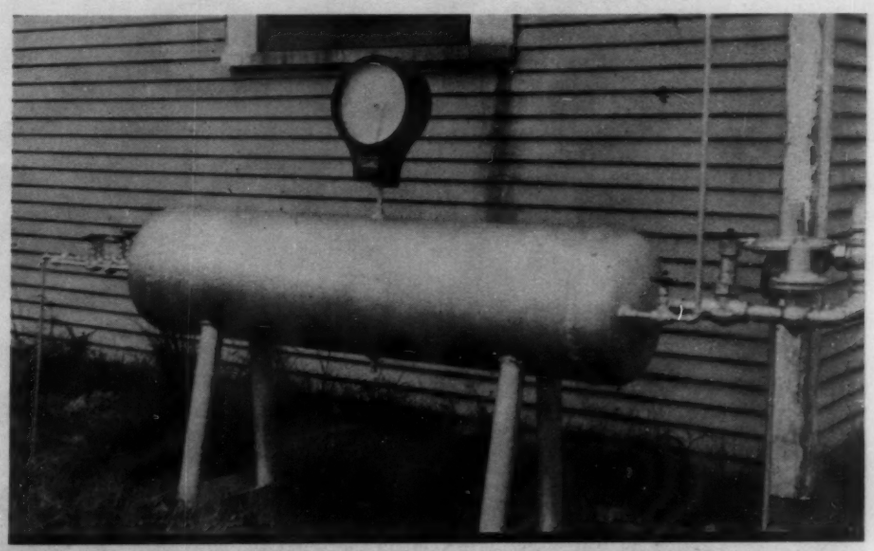
As illustrated in Fig. 1, the up-stream inlet consists of a three-way manifold of 1/8-in. pipe. Branches 1 and 2 of the manifold are fitted with 1/8-in. needle valves (*b* and *d*) which serve as the adjustable orifices. Valves *a* and *c* are shut off valves. Branch 3 of the manifold is a by-pass direct from the line into the tank and fitted with a shut-off valve.

The line pressure on the up-stream side is about 175 lbs. and the pressure of the sample being accumulated is allowed to build up to 75 lbs. absolute by the end of the sample period. The size of the orifice through needle valve *b* is arrived at empirically so as to pass enough gas to permit the pressure to build up to 75 lbs. absolute over a 24-hour period. The orifice through valve *d* is adjusted for a 48-hour period in which to build to 75 pounds. Thus a true average sample is obtained for either a one- or two-day interval by alternately opening or closing shut off valves *a* and *c*.

The accuracy with which the orifices can be adjusted is illustrated by a typical pressure chart for a 24-hour period shown in Fig. 2. The error

FIG. 1.





Accumulator designed for obtaining average gas sample over long day intervals.

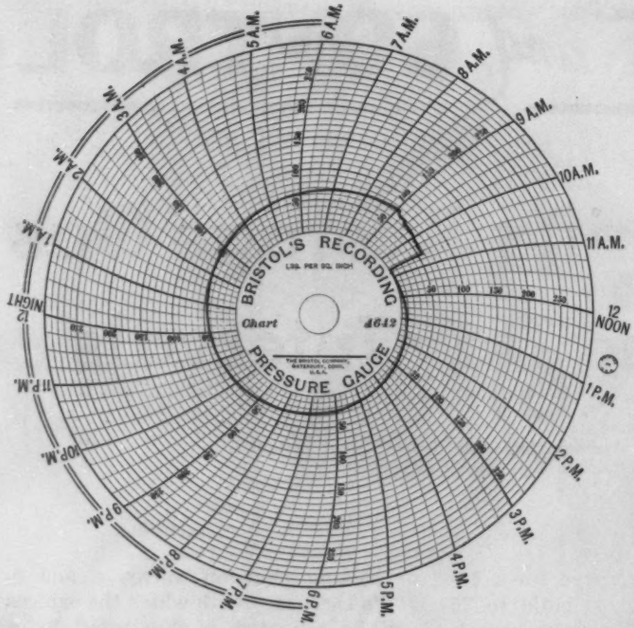


FIG. 2. Typical pressure chart for 24-hour period.

introduced by starting with atmospheric pressure in the sample tank at the beginning of each sample cancels itself with the succeeding sample.

The down-stream side outlet of the sample tank is of 1-in. pipe provided with a shut off valve. In running the test of the sample the gas is first stepped down to 10 lbs. through regulator R and down to service pressure through regulator R_1. It is then passed to the calorimeter and to the gravity balance. When enough gas has been tested so that the tester has obtained a satisfactory B.t.u. reading and its gravity has been determined, the remainder of the sample is blown to atmosphere and the tank is purged by blowing gas through the by-pass arm of the manifold and another sample is started.

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Ford Builds Waterless Holder For Blast Furnace Gas

THE 2,500,000-cu. ft. capacity gas holder which is now under construction at the Rouge Plant of The Ford Motor Co. at Dearborn, Mich., is of the center column, positive liquid seal, waterless type, and consists of a vertical cylindrical shell 128 ft. in diameter by 226 ft. high to apex of roof, and in addition there is a roof ventilator 11 ft. high and a beacon tower 33 ft. high, making its total height above ground level 270 ft.

The shell of the holder is made by the welding of 42 courses of steel plates rolled to the curvature of the holder, to "T" bars at the horizontal joints and to 20 equally placed "I" beam columns at the vertical joints.

The center column, which is the special feature in which this holder differs from the great majority of positive liquid seal waterless holders, is 66 in. in diameter by 223 ft. high, and is fabricated by welding heavy rolled steel plates around heavy steel diaphragm plates, resulting in a column having a total weight of 175,000 lbs. after assembling at the holder site. The assembled column is erected in one piece by special derricks and is anchored to its foundation at the center of the holder.

The piston or disc, which floats on the gas in the holder, is guided by vertically widely spaced shoes riding on the center column. The escape of gas from below the piston at the center column and also at the inner circumference of the shell is positively prevented by an automatically maintained liquid seal, tar being used in this case.

The cone-shaped, welded, plate steel roof is supported by structural members extending from the top of the shell columns to the top of the center column.

An outside electric elevator in a round steel casing gives access to roof and also to each of the several intermediate galleries around the outside of the holder shell, and another electric elevator of special design extends from the underside of the roof to the top of the piston regardless of its position. The total weight of the holder on its foundation will be approximately 2,500,000 lbs.

■ ■

Oklahoma Natural Constructs Meter Testing Plant

Construction of a $20,000 meter testing plant in Oklahoma City, Okla., is under way by Oklahoma Natural Gas Co. All meter testing for the western half of the state will be centralized in the plant. A warehouse and garage will probably be added next year.

■ ■

Edcouch Grants Franchise

The Rio Grande Valley Gas Co., Brownsville, Texas, on October 16 was granted a 30-year franchise by the city council of Edcouch, Texas, to serve natural gas in that community.

■ ■

Albert, Kan., Votes System

Albert, Kan., has voted to issue $2,500 in bonds for construction of a gas distribution system. Gas will be supplied by Schermerhorn Oil Corp. from two wells less than two miles from the town.

New Wilcolator Oven Control Shows Heat at All Times

A new oven control to take the guesswork out of home cooking is announced by The Wilcolator Co. of Newark, N. J., manufacturers of thermostatic devices for household use. It is named Visi-Therm, because it indicates the oven temperature at all times.

Wilcolator engineers designed Visi-Therm to make the oven control as easy to understand as the common, everyday household thermometer. After the Visi-Therm dial is set at the desired oven temperature, a rotating, visual pointer shows the gradual temperature changes as the oven heats.

With the Visi-Therm, engineers claim, greater oven efficiency and faster preheating is attained because of the new valve construction which permits a higher gas capacity.

■ ■

"Inks" Article Based on Bureau of Standards Data

In the June, 1937 issue of G A S on page 65 appeared an article, "Recording Inks," by F. E. Bradley. The source of information upon which the article by Mr. Bradley was based was taken from Circular C413 "Inks' (December 28, 1936), by C. E. Waters of the National Bureau of Standards, and Research Paper RP935, *Journal of Research* of the National Bureau of Standards, "Inks for Recording Instruments," by the same author, (November, 1936). No acknowledgment of Mr. Waters' work was made with the publication of Mr. Bradley's article. *G A S* rectifies this error by now making such acknowledgment.

■ ■

Coquille, Ore., May Change

Natural gas for Coquille, Ore., is forecast with the purchase of a one-year option on the Coquille Gas and Power Co.'s gas plant and distribution system by W. E. Marrion, president and manager of Coast Oil Co. Under the terms of the option, natural gas would be piped from a well in the Fat Elk area, two miles southwest of Coquille. The gas is reported to have a B.t.u. rating of 1010. The fuel is expected to be available in Coquille before the last of the year.

J. V. Thomas Presents Paper At S.C.M.A. Meeting

J. V. Thomas, vice-president of Natural Gas Equipment, Inc., presented the feature paper at the October meeting of the Southern California Meter Association, held on October 28 at the Van Matre Inn, Huntington Park. Title of his talk was "Advantages of Pressure Loaded Regulator Construction." His paper covered the advantages of pressure loaded regulators and presented a resume of their construction and application. He also described several special installations using pressure loading. Mr. Thomas illustrated his talk with slides.

Entertainment was provided by the Keamoku Hawaiian Trio through the courtesy of Natural Gas Equipment, Inc. A motion picture, "Flying the Lindbergh Trail," showed the trail blazed by Colonel Charles Lindbergh for Pan-American Airways.

■ ■

J. A. Schallenberg Advanced

J. A. Schallenberg on October 1 became assistant comptroller of Worthington Pump and Machinery Corp. Mr. Schallenberg has served the corporation in various capacities in the treasury and accounting departments during the past twenty years. Since 1930, he has served as special representative of these departments, with headquarters in Paris, France. While the affairs of the foreign subsidiary companies will continue to have his attention, the major portion of his time will now be devoted to the parent corporation.

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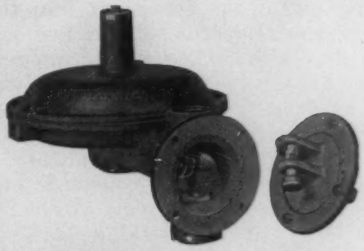

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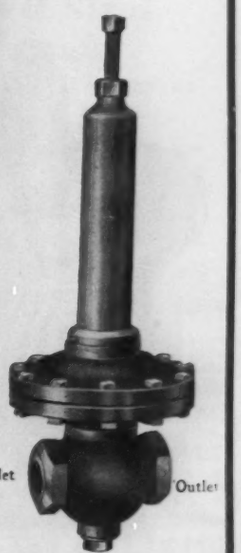
Equipped for high pressure, it reduces from 300 pounds to any desired pressure between 10 and 50 pounds. For low pressure, reduces from a minimum of 50 pounds to any outlet pressure not exceeding one pound. Catalog on request.



THE CHAPLIN-FULTON MFG. CO.

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Gas Transmission Line Capacity

(Continued from Page 26)

is being changed. If gas is being drawn out of the line faster than it is being put in, or being put into the line faster than it is being drawn out, the flow will be less than computed, since the pressure at the outlet will be abnormally low in the first case and the pressure at the inlet will be abnormally high in the second case.

The assumption of constant temperature is probably sound except for the effect of compressing stations. Compression raises the temperature of the gas, and it takes about 30 miles for the gas to reach ground temperature. If there is a considerable difference in temperature between one end of the line and the other it is necessary to take some intermediate temperature. For example, if the distance between stations is 60 miles, the inlet temperature 90°F., and the outlet temperature 35°F., a fair approximation would be to take 55° F. as the flowing temperature.

The assumption that the pipe is straight, round, and level is really three assumptions. Of these, the assumption of roundness is certainly justified, since any pipe which was sufficiently out of round to affect its carrying capacity would not be used. A degree of out of roundness which would be entirely negligible from the flow standpoint would make joining impossible. The pipe is usually straight. Occasional bends may be made, and such bends will reduce the flow capacity, but for the type of bends usually made an allowance of say five pipe diameter per bend is ample. Many pipe lines are not level, and sometimes the correction for change in elevation is important. The correction is greater at light loads. Stodola[14] gives the method of making the correction, and Ferguson[15] has described its application to a gas line. The correction involves substituting

$$\frac{P_1^2 - P_2^2}{L}$$

for the term

$$\frac{P_1^2 - e^s P_2^2}{L_e}$$

. Since the correction is not usually of great importance, and since it has been rather thoroughly described by Ferguson, I merely mention it here. In case any reader should wish to use this correction, I should point out that for correction terms one significant figure is sufficient, and that for the elevation correction it is sufficiently accurate to replace e^s by $1 + s$ and $\frac{e^s - 1}{s}$ by $1 + \frac{s}{2}$. These changes will reduce the labor required in computing the correction.

The assumption that the pressure drop is due only to pipe friction is only approximately justified even under the best conditions. Accidental obstructions, such as dirt, dust, rust, water, oil, gasoline, ice, and welding icicles, will lower the line capacity, but no formula can be devised to show by how much. Corrosion may cause pocks or tubercles, and these will set up eddies which add to the pressure drop. Even if the pipe is clean and not corroded there will be an additional pressure drop at each joint, whether it be welded, screwed, or coupled. In addition, there are usually valves and fittings, each of which causes an additional pressure drop.

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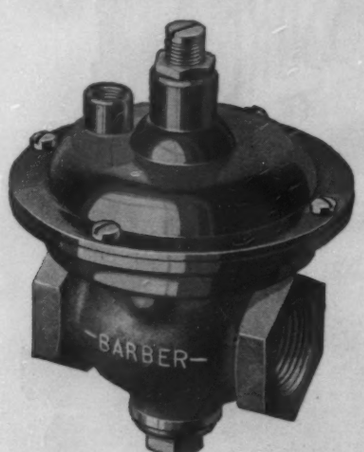

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The actual capacity of the pipe line will therefore always be less than that predicted by Equation (7); Equation (7) may be considered the formula for a perfect pipe line, and actual pipe lines may then be rated in terms of the perfect pipe line, thus giving meaning to the term pipe line efficiency.

Pipe line efficiencies must be determined by test, but some notion of probable efficiency must be used in design calculations. The approach must be through the results of tests which have been made. From the tests with which I am familiar an efficiency of 95 per cent can be expected under favorable conditions, and only unusually unfavorable conditions will cause the efficiency to drop below 90 per cent. To support this statement I may mention the tests reported by Johnson and Berwald. I have calculated the efficiences for 26 of their tests—all of those which were made on supposedly clean lines under steady flow conditions with a pressure drop greater than 4 lb./in.^{2} Of the 26, seven showed efficiencies of 100 ± 2 per cent. Eight were in the group 95 to 98 per cent efficient. Four were between 90 and 95 per cent efficient. Seven showed efficiencies less than 90 per cent, of which three were less than 85 per cent efficient. Furthermore, Trelease[16] gave some figures on the performance of a section of the line which carries gas from Texas to Denver. From these I have determined

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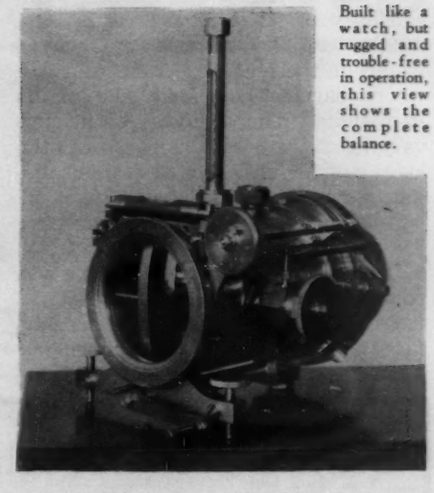

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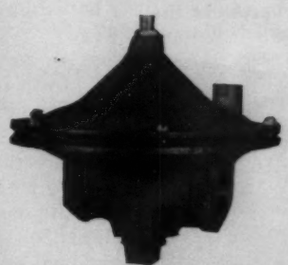

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that this section, when clean, has an efficiency of 92 to 93 per cent. And finally we have a large number of tests[13] on the several sections of a line which carries gas from the Texas Panhandle. These showed efficiencies varying from 86 to 99 per cent, the averages for the several sections being at various times from 89 to 95 per cent, and the weighted average for the entire line over a long period being 92 per cent. Since this line was constructed in 1927, and showed 92 per cent efficiency in 1935, it is sufficiently conservative to take 90 per cent as the probable efficiency for design calculations.

The difference between 90 and 100 per cent is still important. The necessity for keeping pipe lines clean has been stressed by many writers, and no elaborate exposition of the cost of dirt in pipe lines seems necessary at this time. But far too little is known about the effect of methods of joining pipe on efficiency, and an investigation of this subject would be of great benefit to the industry.

This rather sketchy discussion of the factors which may make the actual pipe line capacity different from that predicted by any formula may serve to explain the success with which the Weymouth formula has been used. It has been shown that the difference between the flow rates computed by the Weymouth formula and by the new formula are affected by the load. At very light loads the flow rate predicted by the Weymouth formula will be higher; at peak loads, lower. But in general the flow rate predicted by the new formula, without consideration of the efficiency of the pipe line, will be higher than can actually be obtained. It so happened that in many cases the flow rate was such that the underestimation by the Weymouth formula approximately compensates for the absence of 100 per cent flowing efficiency in commercial pipe lines.

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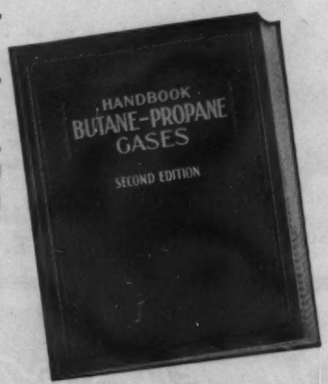

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GAS

The NATURAL Gas Magazine

810 S. Spring St.
Los Angeles, Calif.

C. E. White Joins Waukesha Gas Power Division

CECIL E. WHITE, formerly sales promotion specialist for the Milwaukee division of the Standard Oil Co., has been appointed assistant to H. V. Kilpatrick, head of Waukesha Motor Co.'s newly formed gas power division. As a member of the division's sales staff, he will devote most of his time to sales promotion planning of Waukesha's new automatic power units and automatic deluxe gas power units.

C. E. WHITE

Mr. White, a graduate of the University of Wisconsin, was an instructor in agricultural engineering at that university, and in automotive engineering at the American School of Correspondence, Chicago, before joining Allis-Chalmers Manufacturing Co. For 12 years he has been with Standard Oil Co., directing salesmen's activities and conducting sales training meetings.

Franchise to Northwest Cities

Permission to serve natural gas as well as manufactured gas was granted by the city council of Pendleton, Ore., to Northwest Cities Gas Co., Walla Walla, Wash., in a 30-year franchise for operations in Pendleton. The company first operated there under a 25-year franchise, then under a permit for three years. It serves manufactured gas. Northwest Cities Gas Co. is a subsidiary of Lone Star Gas Corp.

P.C.G.A. Proceedings Out

Volume 28 of the *Proceedings of the Pacific Coast Gas Association*, covering the work of the Association during the year 1937, will be ready for mailing to all Association members early in November.

BUTANE-PROPANE NEWS

WALTER VERKAMP

G. A. BURRELL

Bottled Gas Men Convene At A. G. A. Convention

APPROXIMATELY 125 men active in the liquefied petroleum industry attended the meeting of the National Bottled Gas Association which was held Tuesday morning, September 28, at the Cleveland Hotel in conjunction with the Nineteenth Annual Convention of the American Gas Association, which met in Cleveland, September 27 to October 1. Walter Verkamp of Verkamp Corp., Cincinnati, Ohio, is president of the Association.

At the Association's executive board meeting, held Tuesday afternoon, it was voted to recommend that the name of the Association be changed to the Liquefied Petroleum Gas Association, it being felt that this name would more generally cover the many interests of the industry.

The regular annual meeting of the Association will be held at the Waldorf Astoria Hotel in New York City, January 19, 1937.

Three papers were presented before the recent Cleveland meeting. Excerpts from two of these: "Trends in Retail Distribution of Liquefied Petroleum Gas" by George A. Burrell, vice-president, the Atlantic States Gas Co., and "Government Aided Competition Versus Unity" by F. L. Kohler of Southern Protane Service, are published on these pages.

■ ■

C.G.M.A. Meets in January

Compressed Gas Manufacturers' Association, Inc., will observe its 25th anniversary at the next annual meeting, to be held January 17 and 18, 1938, at the Waldorf-Astoria Hotel, New York City. Arrangements are being made by the past presidents. H. S. Smith of Union Carbide and Carbon Corp. is chairman of the committee planning the technical meetings.

Retail Trends in Liquefied Petroleum Gas Service

● **GEORGE A. BURRELL, vice-president, Atlantic States Gas Co., New York, N. Y.; addressing the National Bottled Gas Association meeting during the American Gas Association nineteenth Annual Convention, Cleveland, Ohio, September 27 to October 1, 1937. Topics: "Trend in Retail Distribution of Liquefied Petroleum Gas."—(Abstract by G A S).**

HOW many customers are actually being served by the Liquefied Petroleum Gas Industry at the present time is uncertain, but figures might be estimated at 350,000 to 400,000 families.

Although the industry started in a small way almost 30 years ago, only in the past 15 years has it developed into an industry of consequence. At that time the Carbide and Carbon Chemicals Co., following their success with the helium plant in Texas, inaugurated a program which has developed to a high point. Messrs. Thompson and Bunn have taken the lead for their company in this achievement. The Phillips Petroleum Co. under the active management of George Oberfell, ably assisted by H. Emerson Thomas and Ross Thomas inaugurated their Philgas program in 1928. The Standard Oil Co. of California is very active on the coast, and these three companies probably serve one-half of the total homes in the land served with liquefied petroleum gas.

One must mention the pioneer of them all, Herman Blau in Germany, in 1903, and in our own country, A. N. Kerr, Imperial Gas Co., Los Angeles; J. B. Garner of the Standard Oil Co. of New Jersey, the Skelly Oil Co., The Shell Petroleum Co., I. N. McNay of the McNay Gas Co., Ephrata, Pa., and many others too numerous to recount. Mr. Byron Stroud, the author's associate, has been in the industry for many years.

The Atlantic States Gas Co. has addressed itself to the problem of supplying a service equal in all respects to the best city gas service. This means an adequate supply of gas at all times, a gas load, within our price range, equal to city gas loads, and a saturation of customers in an area comparable to those of piped gas systems, offering the same service and the same price schedule.

It further meant the selling of gas through a meter and billing the customer each month. Also the establishment of an adequate corps of service men to handle customer wants, domestic economy women to acquaint users, and prospective users, with modern gas appliances and modern cooking methods.

The company further installed, and still maintains a sales force, which for the area covered probably represents a new high in sales staffs of bottled gas companies. This is necessary for quick saturation in rural regions; far more so than in the case of piped gas in cities.

In the cities, before piped gas is introduced, the residents accept its coming as a matter of course. They know enough about gas to accept it without hesitation. A saturation up to 50 per cent of the families in one year's time is not uncommon. An 80 per cent saturation in six years' time, has been obtained.

Country and small town people, however, do not know as much about gas. Furthermore, a bottled or tank gas system is frequently quite strange to them and companies installing same do not appear to them to be as permanent as pipe gas companies with their background of years of activity and hundreds or thousands of miles of pipe line and auxiliary equipment. Also, competition and propaganda from the electric industry and from improved coal and oil ranges must be met.

But if gas rates permit, and if adequate gas service is installed, custo-

(Continued on Page 78)

Just the propane cylinder valve you have been looking for . . . combines the famous Kerotest Forged Brass Diaphragm Packless valve design with a spring safety device which automatically relieves *only* the excess pressure that may build up in a propane cylinder. Furnished with or without operating handwheel. Listed as standard by Underwriter's Laboratories.

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Analyzing Electric Saturation of the Bottled Gas Market

● **F. L. KOHLER, Southern Protane Service, Washington, D. C.; addressing the National Bottled Gas Association meeting during the American Gas Association nineteenth Annual Convention, Cleveland, Ohio, September 27 to October 1, 1937. Topic: "Government Aided Competition versus Unity." —(Abstract by G A S).**

IN discussing the many millions of dollars appropriated by our government for disposal through the Rural Electrification Authority and other similar agencies recently, there are evident certain figures which should be of interest to all using private capital to compete with utilities with huge financial resources of their own plus government backing.

An editorial appearing in *Electrical Merchandising* for August states: "Farmers have been led to expect so rapid an extension of electric high lines that they have put off home appliance buying until they get electricity.

The editorial further reasons: "The highest estimate of the Rural Electrification Authority is that 165,000 farms will receive electric service this year through government aided projects. Private utilities will extend power to another 160,000 farms. This does not make more than a dent in the total of about 6,000,000 farms now without electricity. Nor will electrification proceed more rapidly in coming years. The government program sets as a goal the electrification of only 840,000 farms during the next eight years. Private utilities may equal or exceed this number and yet, with all this drive on bringing electricity to farms, by 1945 there still will be over 4,000,000 farms without high line service. These facts the rural population should be told so that they may be awakened from their day dream of immediate electrical service."

It is the author's opinion that the conditions as depicted by the above figures are the concern of every bottled gas dealer and he should use these figures to his greatest advantage.

To carry these figures a bit further we find that the percentage of homes using electric ranges is a mere 7.9 per cent out of a possible 20,152,324 homes which are wired. This would leave the bottled gas industry a goodly share of the remaining 92.1 per cent as well as the full market of unwired homes. This is something to shoot at especially since the bottled business can complete installations in these unwired homes, if it gets on the job and sells its product before the electrical men can even plant the first group of poles.

■ ■

U. S. Circular Deals With Liquefied Petroleum Gases

Propane, butane, and related fuels are the subject matter of Letter Circular No. 503, issued September 1, 1937, by the National Bureau of Standards of the U. S. Department of Commerce.

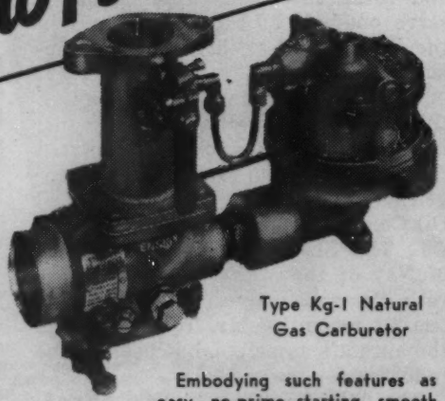
Much of the material in the 34-page multigraphed circular is taken from *The Handbook of Butane-Propane Gases*, published by Western Business Papers, Inc., publishers of G A S.

■ ■

Central Plant for Matador

Public Service Corp. of Texas is preparing to install a central butane plant at Matador, Texas, according to Thos. Cook of the company. Date when construction will begin has not yet been set.

ENSIGN
Continues to Pioneer



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Butane Equipment; Gas and Gasoline Carburetors for Industrial Engines and Tractors.

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Oberseider Paper Wins First Place In P.C.G.A. Poll

THE most useful Industrial Gas Utilization Data Bulletins, published by the Pacific Coast Gas Association during the Association year 1936-37, have been determined, by poll of some 90 Association members who regularly receive the bulletins, to be the following:

1. *Estimating Hot Water Requirements, Sizing and Selecting Gas-Fired Volume Water Heating Equipment*, by J. Louis Oberseider, Southern California Gas Co. Bulletin No. 47.
2. *Large Salt Bath with Immersion Elements*, by E. H. Adler, San Diego Consolidated Gas and Electric Co. Bulletin No. 46.
3. *Forced Air Heating System for Greenhouses*, by Louis Wollenberger, Coast Counties Gas and Electric Co. Bulletin No. 40.
4. *Pre-Mixed Gas for Stereotype Room Using Immersion Heating Units*, by E. H. Adler, San Diego Consolidated Gas and Electric Co. Bulletin No. 43.
5. *The Use of Gas in the Evaporation of Moisture in Rug Cleaning*, by W. W. Howe, Pacific Gas and Electric Co. Bulletin No. 44.

C. C. McRae, Pacific Gas and Electric Co., collected the material for the series of bulletins. R. T. Stephens is chairman of the Industrial Sales Committee which conducted the poll. The Association offered five prizes totaling $75.

■ ■

Johns-Manville Issues Book And Movie on Heat Control

A motion picture and a booklet have been prepared by Johns-Manville setting forth the story of heat and its control from earliest times and stressing the advancement that is constantly being made in the more effective utilization of heat in industry.

The motion picture is entitled "Heat and Its Control," and runs for 50 minutes. The 48-page booklet, entitled "Heat," covers the same ground as the movie, but in greater detail. The booklet is generously illustrated. It may be had on request.

■ ■

Emmetsburg, Iowa, Votes $79,000 Propane Plant

A $79,000 propane gas plant for Emmetsburg, Iowa, was voted at a special election on October 14.

The distribution system calls for 4680 ft. of 3-in. coated pipe, 45,320 ft. of 2-in. coated pipe, and 30,000 ft. of bare ½-in. copper pipe. Propane gas of 530 B.t.u. will be served.

About 200 meters are expected the first year. The Gas Service and Engineering Corp., St. Louis, Mo., made the survey which preceded the city vote.

■ ■

Pacific Coast Revenues Mount More Than 9.3 Per Cent

Gas utilities in California, Arizona, Nevada, Oregon, Washington, and British Columbia reported an increase in revenues during July, 1937, over July, 1936, of 9.1 and an increase in gas sales of 7.8 per cent. The figures were prepared by the American Gas Association.

In August, revenues in these Pacific Coast states were 9.3 per cent higher than in August, 1936, and gas sales were 5.7 per cent better.

Natural gas revenues in California during July, 1937, were up 8.6 per cent, and gas sales up 5 per cent. In August, California natural gas revenues were 8.7 per cent better than a year ago, and gas sales 2.7 per cent higher.

■ ■

Bupane Co. To Retail

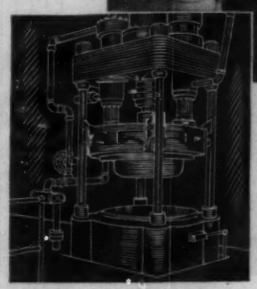
Retail outlets for Bupane gas and for appliances have been opened by Bupane Gas Co. of Cedar Rapids, Iowa, in Manchester, Iowa City, and Waterloo, and rural users of bottled gas may pay for it on a monthly basis instead of by can.

Clark Compressors Ordered For Edmond Field

Clark Bros. Co., Olean, N.Y., report the receipt of an order for seven 250-hp. Super 2-Cycle Horizontal Twin compressor units. These are to be installed in the Edmond field of Oklahoma for gas booster service.

The company also reports the receipt of an order for 15 250-hp. twin cylinder Super 2-Cycle Horizontal gas engine driven compressors to be used in the natural gasoline plant in the same field.

Clark Bros. Co. also reports the sale of a Clark Super 2-Cycle Angle Compressor, in the new 6-cylinder 600-hp. size, to be used for gas booster service by the Canadian River Gas Co.



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Containers for Gases, Liquids and Solids

Trends In Liquefied Gas Service

(Continued from Page 75)

mer resistance and competition give way in a satisfactory degree, roughly, in proportions to the sales efforts expended. The latter includes newspaper advertising, demonstrations, booklets, and leaflets, and most important, installations in the neighborhood of prospective customers. The author's personal view is that contact by the salesmen and demonstrations before groups of women constitute the most effective method of selling.

We do not expect, nor ever expected, to grow as fast as have piped gas companies in the cities, but there are a few towns where our customer saturation has passed 50 per cent in a little over one year's time. These are spots that have been diligently cultivated by energetic and able salesmen, and places where the average income is relatively high.

Tanks are buried under ground with only the green cover plate of the curb box showing, and are of 125 to 600 gal. in size. A tank of 125-gal. size will last a customer using 3,000 cu. ft. of 530 B.t.u. gas per month, about seven months. Thus in the case of the great majority of customers it is possible to choose the time at which tanks are filled from tank trucks, thus avoiding filling them in regions of bad or impassable roads, in the winter time.

Thus far there has been discussed gas service and its attendent problems, but the author is constrained to emphasize, even more than the matter of gas service, the question of gas appliances, for in a gas business of rapid growth, one is precipitated headlong into the appliance business and gas appliances have given far more headaches than the gas system. In the latter there is little to get out of order. The only parts that have given us any trouble of consequence are rubber discs in regulators.

City gas companies probably do not find the situation as acute as do fast growing bottled or tank gas companies. In the main they have reached customer saturation and the installing and servicing of new ranges are not a highly important part of their operations. Also, they do not have to travel far to service appliances. Further, they sell to customers who are familiar with gas range care and operation.

What lies ahead? He is rash who attempts to prophesy too far ahead, but it is perhaps safe to say that over the next few years there will be a rapid development in our business, exceeding that which has gone before during an equal period of time.

There are of the order of 16,000,000 families still without gas service in the United States. An equal number are served by pipe gas companies.

Of course, there are regions of low purchasing power and areas too thinly settled for economical operation. Some districts have also been cultivated by the electric companies, and in some cases with the advantage of low rates, where a farmer, say, has enough other electric appliances to bring his rate down. Gas companies will also be confronted with prospective customers who have recently invested in modern and expensive coal and oil ranges.

Gas Maintains Lead

But the gas stove, superior for cooking purposes, has retained its lead despite the improvement in electric ranges. Water and space heating by electricity are expensive. There is competition from electric refrigerators, but even here there is a satisfactory volume of business in the sale of gas refrigerators. In some cases coal passes out of the picture even on a strictly B.t.u. basis.

Probably the most satisfactory answer to the question of gas versus other fuels lies in the experience of city gas companies. They are confronted with all of the competition mentioned yet maintain their high customer saturation even, in many instances, with comparatively high gas rates.

Many companies will cultivate this huge market, for there is room for many. New ideas will be advanced, for many people are giving the matter serious thought, and such competition as develops will be a healthy thing for the industry and will result in the best possible service for the customer. This is the way of American business.

■ ■

EQUIPMENT WANTED

Can use unlimited quantity of 1A Sprague cast iron meters or its equal for gas. Must be in good serviceable condition.

JOS. GREENSPON'S SON PIPE CORP., National Stock Yards (St. Clair Co.), Ill.

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YOU CAN DRIVE YOUR CAR RIGHT INTO HOTEL SHERMAN

Glenmora Finishes New Line

Glenmora, La., has completed construction of 13 miles of natural gas transmission lines and 13 miles of distribution lines for a municipal system. The project cost approximately $63,000. Glenmora furnished $20,500 of that, and the WPA helped with the rest.

Indiana Utilities Separate Operating Activities

STEPS toward the separation of operations of the Public Service Co. of Indiana and the Northern Indiana Power Co. were taken at a recent directors' meeting, according to J. N. Shannahan, president of the two companies.

L. B. Schiesz, who since 1929 has been comptroller of the companies, was elected vice-president and general manager of the Northern Indiana Power Co., succeeding C. D. Porter, who was elected to the board of directors of the Public Service Co., of which company he also is a vice-president.

Robert A. Gallagher was elected vice-president and director of the Public Service Co. of Indiana. For the last 19 years Mr. Gallagher has been associated with utility companies and has done considerable work in connection with various Indiana utilities.

Both the Public Service Company of Indiana and the Northern Indiana Power Company operate electric, gas, and water utility services in the north central, central, and southern sections of the state. Public Service operates in 52 counties, and Northern Indiana Power in 30 counties.

■ ■

Baldwin Is Superintendent

George C. Baldwin has been appointed division gas superintendent, Northern Division of the Public Service Co. of Northern Illinois. He will have general supervision over the gas sales, engineering, and operating work carried on by the Northern Division. He has been with the company since 1923, as assistant in the construction department, construction supervisor, assistant engineer, and division sales manager.

■ ■

General Controls Opens Chicago Branch Office

A branch office has been opened in Chicago by the General Controls Co., manufacturers of automatic temperature, pressure, and flow controls. Complete stocks and service and engineering facilities will be maintained.

According to A. W. Ray, vice-president in charge of sales, the company now offers full stocks as well as engineering facilities in four direct factory branches in New York, Chicago, Cleveland, and San Francisco, with distributors in all principal cities.

The new Chicago office, at 450 East Ohio Street, will be under the management of H. G. Wasserlein, graduate engineer.

■ ■

Natural Gas Revenues in July Up 10.8% Over 1936

Natural gas revenues in July increased 10.8 per cent over July, 1936, according to statistics prepared by the American Gas Association. Total revenue for July of this year was $26,442,800. Manufactured gas revenues increased 2.9 per cent over July, 1936, to $27,906,200.

Industrial sales of natural gas increased 15.8 per cent during the month.

Hoyt Named to Electrogas Sales Executive Post

W. L. HOYT

W. L. Hoyt has been appointed an executive of the sales department of Electrogas Division of Payne Furnace & Manufacturing Co., San Francisco, Calif. Mr. Hoyt was formerly associated with the American Gas Products Co., the H. R. Basford Co., and the Rheem Manufacturing Co.

■ ■

Cabot Puts in Girbotol Unit

To remove hydrogen sulphide from natural gas used as engine fuel and for domestic heating, The Cabot Carbon Co. has completed and put into operation a Girbotol purification unit in its new gasoline plant at Kermit, Texas. The unit is similar to the one which has been in operation for several years in the Shell-Continental plant at Hobbs. The Girbotol process is licensed by The Girdler Corp. of Louisville, Ky.

■ ■

Industrial Gas Sales Meet

The fall meeting of the Midwest Industrial Gas Sales Council was scheduled for October 29 at the Palmer House, Chicago, Ill., according to announcement by Nathan Schofer, publicity chairman.

The Great Good Will Builder for Gas Heating...

Immediate gas heating profits and eventual sales of complete gas heating systems are yours when you drive for the installation of Humphrey Ambassadors in your territory. That's why we gave this forced circulation heater the name "Ambassador," because it so conclusively demonstrates the cleanliness, convenience, and economy of gas heating.

Nearly every home has one or more rooms where extra heat is needed—sun parlor, den, living room, or recreation room. And in the warm climates, Humphrey Ambassadors are ideal for heating the entire house. Write today for the complete story of this popular gas heater and how it can be sold in homes and commercial establishments.

A HUMPHREY PRODUCT

The HUMPHREY AMBASSADOR

The input rating of the Ambassador is 40,000 B.t.u. per hour. Its design is pleasingly modern and distinctive.

GENERAL GAS LIGHT CO. KALAMAZOO, MICHIGAN

In Los Angeles
it's the
HOTEL
CLARK
Fifth and Hill

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Rooms-Baths

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Famous for Good Food from Coast to Coast

RIGHT downtown in the center of things. Easy chairs, sleep-inspiring beds, large rooms with luxurious fittings.

P. G. B. MORRISS
Manager

The A. G. A's Cleveland Convention

(Continued from Page 31)

The new chairman of the department is Hugh Cuthrell, vice-president, The Brooklyn Union Gas Co. F. X. Mettenet, vice-president The Peoples Gas Light & Coke Co., Chicago, is the new vice-chairman.

A feature of the Tuesday afternoon Commercial program was offered by John F. Quinlan of A. G. A. headquarters, who outlined the Association's home planning program. The plan includes a nation-wide architects' and builders' contest, which will not only serve to educate the architects and builders with regard to up-to-date gas appliances, but will also induce them to apply such appliances in home designing. A more complete outline of the plan is presented on Page 34 of this issue.

Also up for discussion during the Commercial Section Sessions was the topic of the "Certified Economy Range." In a further attempt to offset competition and to prove the superiority of gas for cooking, the A. G. A., through a committee headed by Hugh Cuthrell of The Brooklyn Union Gas Co., has fostered the establishment of superior domestic range requirements above those now enforced by the A. G. A. Laboratories.

It is expected that the "Certified Economy Range" will be made by a number of manufacturers, and will be on the market by March 1. Promotion of the range will be handled through both local and national campaigns.

The first sectional meeting of the Industrial Gas division was preceded by the Industrial Gas Club luncheon at which F. X. Mettenet was the speaker. Ralph L. Manier, chairman of the section, presided over the luncheon and likewise over the departmental meetings.

"Unit Heater Applications in Commercial Establishments," "Evaluation of Gas Commercial Cooking" and "Developing Dealer Cooperation in Hotel and Restaurant Appliance Sales" were the subjects for a series of five minute talks before the Commercial Gas and Equipment forum held the second of the Industrial gas meetings.

The section presented an Industrial Gas and Equipment forum for the concluding session on Thursday afternoon. "Heating Liquids with Gas Immersion Units" was dealt with as one subject. "Convection Heating with Gas" and "Wholesale Baking with Gas" were the bases for other series of five-minute talks.

Those taking part in the Industrial Gas section meetings were Ralph L. Manier, Charles W. Gale, Adam M. Steever, Albert A. Schuetz, Robert G. Guthrie, Oliver Lloyd Maddux, J. F. Quinn, Frederick T. Head, F. S. Pexton, J. N. Crawford, Ralph L. Towne, Terry Hart, Roy E. Wright, J. E. Swenson, W. H. Frick, A. O. Leech, R. D. Clark, T. J. Gallagher, C. H. French, W. M. Jacobs, H. A. Sutton, W. J. Hill, L. B. Crossman, C. B. Mershon, Homer T. Hood, C. H. Lekberg, Karl Emmerling, Edward Stephenson, Jr., W. F. Aylard, D. A. Campbell, Lawrence R. Foote, Clinton B. Cole, L. E. Biemiller, A. M. Thurston and George A. Uhlmeyer.

Hale A. Clark, Detroit City Gas Co., was elected as chairman of the Industrial Gas Section and Frank H. Trembly, Jr., The Philadelphia Gas Works Co., as vice-chairman.

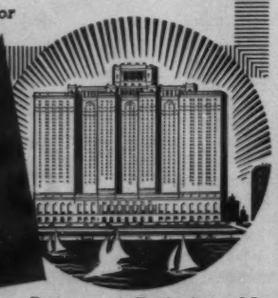
Technical Section

The highlight of the Technical Section program, convening on Tuesday, Wednesday, and Thursday afternoons,

...MEN IN THE MAJOR LEAGUES

Those men every community regards as leaders . . . in turn demand similar superior performance. In Chicago these men find at The Stevens the atmosphere . . . the comfort they demand of a hotel. That's the reason they call The Stevens, "America's Grand Hotel." Their strongest endorsements are their repeated autographs on our register.

OTTO K. EITEL, *Managing Director*



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CHICAGO

Room, with Bath, from $3

was the talk by Oliver S. Hagerman, president, Atlantic Seaboard Co., on "Coordination of Gas Conditioning Research." Mr. Hagerman pointed out that the work of the industry covering gas conditioning has been of a piecemeal nature and that the industry needed to enter wholeheartedly into the subject, forming a related program of action and research. "Statements by operating companies —which emphasize gums, dust, and organic sulphur, show clearly that many gas conditioning problems are today unsolved." This partial quotation from Mr. Hagerman's paper was followed by the recommendation that a Gas Conditioning committee be formed within the Technical Section, and that such a committee "should be a fact-collecting committee, a clearing house for gas conditioning information and that its objectives and end point should be the initiation and following through of well-planned research."

Instead of having to promote discussion in the technical section meetings, the chairman's problem was one of shortening discussion, so great was the interest of the 400 or 500 operating men gathered at every meeting. Discussion of the papers caused the program to be extended overtime on all three days, the delegates remaining an hour overtime on the closing day.

The paper by Louis Schnidman and Jesse S. Yeaw of Rochester Gas & Electric Corp. on "Corrosion of Metals and Alloys by Flue Gases" was among the papers widely discussed. (See Page 36 of this issue).

Those appearing on the Technical program were M. I. Mix, Chairman, F. A. Lydecker, R. E. Kruger, O. S. Hagerman, Louis Schnidman, Jesse S. Yeaw, D. P. Hartson, Prof. C. C. Furnas, F. E. Frey, J. S. Casey, M. A. Hardie, Jr., J. F. Anthes, Dr. Scott Ewing, E. A. Munyan, Dr. Morris S. Viteles, L. G. Witmer. J. V. Postles, assistant to the vice-president The Philadelphia Gas Works Co., was elected chairman and F. M. Goodwin, vice-president, Boston Consolidated Gas Co., vice-chairman.

Every year witnesses much increased interest on the part of the Association and its delegates in the home service program. One hundred and seventy-seven attended the breakfast of this group held on Wednesday morning. The breakfast was given a clear position on the program, with no other attractions for the morning save a trip to the A. G. A. Testing Laboratories.

President Russell and Managing Director Forward brought special greetings to the Home Service group. F. M. Banks, chairman of the Commercial Section, gave his impressions of home service and urged that home service information be made available to every employee of the industry. There followed a talk by Margaret Nevins and a group of two-minute talks by A. Mildred Bailey, Mrs. Eleanor Kingsley, Hulda Ungericht and Mildred Clark.

Elizabeth Sweeney of New York State Electric & Gas Corp., Geneva, N. Y., presided over the breakfast as chairman. Mildred Clark of Oklahoma Natural Gas Corp., has been selected as the incoming chairman of Home Service.

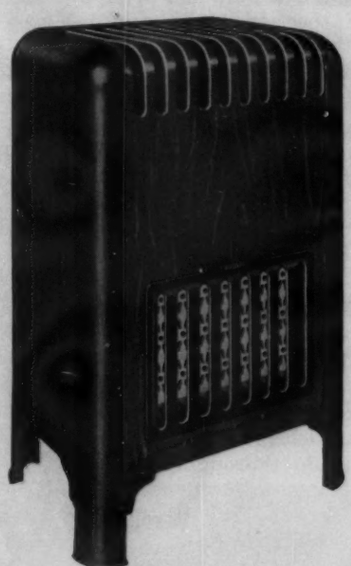
The National Advertising program, mentioned and commented upon by many of the convention speakers, drew the spotlight of interest on the last day of the conference when a group of 124 attended the National Advertising Luncheon Symposium. T. J. Strickler, chairman of the Committee to Conduct National Advertising, and Henry Obermeyer, chairman of the Publicity and Advertising committee, presided over the luncheon.

The discussion topics were "Na-

Announcing the New 1938

FRASER

RADIANT FRONT CIRCULATING HEATERS



★ The heater that SMILES as it warms

More beautiful, more efficient and more practical than ever are the new 1938 Fraser Circulating Heaters. Their open front reveals a warm cheering glow that offers all the advantages of an open fireplace—and none of its disadvantages. Their modern streamline design and their two-tone walnut finish harmonizes with any type of furnishings—makes them a real asset to any room. Made in five sizes from 20,000 to 60,000 B.T.U.'s.

AVAILABLE WITH BUILT-IN FAN

Made in two styles; the standard heater (illustrated) and a similar style with the fan built in as an integral part of the heater. Also made in five sizes—height slightly more to accommodate the compact built-in fan.

Manufactured by

FRASER FURNACE CO.

STOCKTON, CALIFORNIA

DISTRIBUTED BY

H. R. BASFORD COMPANY

425 Second St., San Francisco 911 S. Grand Ave., Los Angeles

YOUR Console Heater SALES Will PROFIT

by the Domestic Room Thermostat

The public is demanding automatic heating. And when a console heater is equipped with a Domestic Room Thermostat to deliver constant automatic heat, it becomes much more saleable merchandise.

The Domestic Room Thermostat is easily installed on the line ahead of the heater. Already many lines of console heaters come factory equipped with the Domestic Room Thermostat. It will pay you to investigate.

Domestic Manufacturing Co.

700 East Florence Ave. Los Angeles, Calif.

DEARBORN CHEMICAL COMPANY

Invites Your Attention

to the increasing use of NO-OX-ID for the protection of pipe lines, gas holders and other steel equipment in the Gas Industry. It is chemically compounded and manufactured in various consistencies to meet requirements as indicated by surveys or other investigations. Suitable wrapper and shield are supplied to cope with the most severe conditions. Recommendations are based on years of experience and practical use under a wide range of conditions. Address us:

310 South Michigan Avenue, Chicago

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tional Advertising by Manufacturers," "Effective Local Tie-in With the A. G. A. Program," "Bringing the Dealer Into the Picture," "Local Promotion of the Mystery Chef Program," "Is There News in Gas Appliance Development?" "Are Newspaper Special Editions Worth While?" "The Laboratory Seal in Gas Company Advertising," and "Getting the 'Breaks' in Hollywood."

Other luncheons held during the Convention were the Industrial Luncheon attended by 95, the luncheon conference of the Committee on Personnel Practices which drew an attendance of 101. The Accounting Section luncheons attracted 234 delegates.

Visiting the Laboratories

Very special mention should be made concerning the inspection trip to the American Gas Association Testing Laboratories on Wednesday morning. Invitations were issued for this trip so that the capacity of the laboratory would not be overtaxed. Delegates were conducted through in two large groups. Each group came together in the assembly hall prior to making the inspection to be told by leaders of the industry of the work of the laboratory and the far reaching effect of its program.

The Annual meeting of the Association of Gas Appliance and Equipment Manufacturers was held on the first day of the Convention. This meeting was presided over by W. T. Rasch, vice-president of American Gas Products Corp., chairman of the group. The new chairman of the Manufacturers' section is Merrill N. Davis, vice-president, S. R. Dresser Mfg. Co. E. R. Guyer, Cribben & Sexton, Chicago, was elected vice-president.

Delegates to the convention were made thoroughly aware of the plan being made for the 1939 New York World's Fair by speakers representing Gas Exhibits, Inc., the non-profit corporation formed by A.G.A. also A.G.A.E.M. to create and stage the finest and most effective exhibit which the industry can produce. This corporation is now proceeding with plans for a building and with the sale of space to manufacturers.

One of the important developments coming out of the executive sessions of the board of directors of the Association was the announcement of the direct affiliation of the A.G.A. and the Pacific Coast Gas Association. The closer affiliation was approved by the Pacific Coast group at its annual convention in Seattle last August. Excerpts from a statement by Norman R. McKee, president of the Pacific Coast Gas Association, follow:

"This affiliation has been entered into solely because the officers and directors of both Associations feel it will be beneficial to the gas industry and to those men and women in the industry who are working for its advancement through our Associations. The work and functions of the Pacific Coast Gas Association will not be changed in any particular."

A generous round of entertainment was provided by the entertainment committee under the chairmanship of W. E. Steinwedell of Cleveland. The President's dance was held the second evening. A Ladies' Luncheon and Bridge was held. Dancing was engaged in again following the second general session held Wednesday evening.

■ ■

Cities Service Co. Augments Natural Gas Supply

As a result of a gas purchase agreement between the Cities Service Gas Co., Kansas City, Mo., and the Phillips Petroleum Co. for purchase of gas from the gasoline plant in the Edmond field north of Oklahoma City, Cities Service Gas Co. is laying about 8½ mi. of 10-in. pipe line from the plant to the Oklahoma City 20-in. line. Phillips Petroleum Co. is building a small compressor station. Construction work was expected to be completed about November 1. The connection will make available from 15,000,000 to 20,000,000 cu. ft. of gas a day in addition to the previous supply previously in use by the company.

■ ■

Cincinnati Utility Centralizes House Heating Work

A heating service division has been set up in the gas commercial department of the Cincinnati (Ohio) Group, Columbia System, to care for the selling, installation, and servicing of gas house heating central appliances. Otto H. Rodenberg has been appointed chief of the new unit, according to announcement by E. R. Rothert, head of the Gas Commercial department.

Heretofore this department handled only the selling of gas house heating appliances. Installation and servicing were cared for by the Gas Operating department.

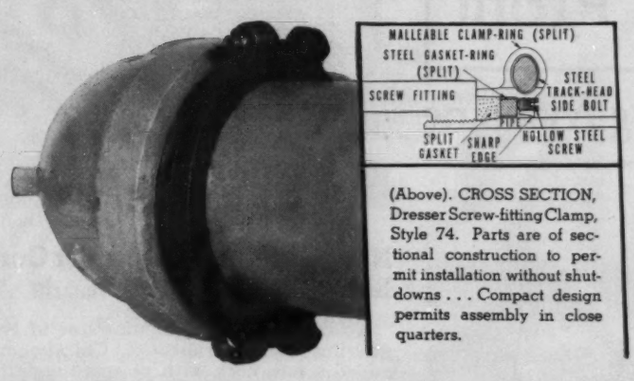
■ ■

Mankato Natural Gas Co. Names Executive Staff

Executives of Mankato Natural Gas Co., which has introduced natural gas into Mankato, Minn., after taking over the Mankato and North Mankato systems of the Northern States Power Co., have been announced as follows:

R. E. Crawford, president; A. W. Scofield, business and sales manager; O. M. Hoxie, director of the plant and local operations, formerly with the Northern States Power Co.; E. O. Chaudoin, auditor; D. J. Reimers, chief engineer.

END SCREW-FITTING LEAKS!



(Above). CROSS SECTION, Dresser Screw-fitting Clamp, Style 74. Parts are of sectional construction to permit installation without shutdowns . . . Compact design permits assembly in close quarters.

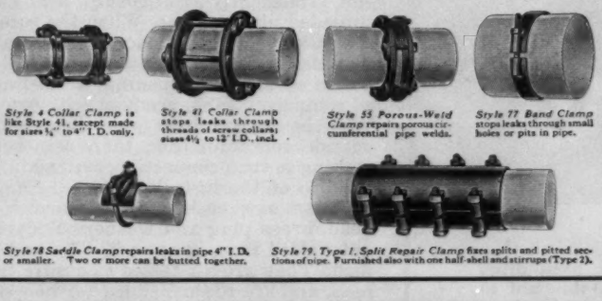
Leaks through the threads of screw fittings such as ells, tees, companion flanges, etc., may be quickly, economically, and *permanently* repaired without interruption of the service by the use of Dresser Screw-fitting Clamps, Style 74. These clamps also stop leaks where pipe screws into a drum or tank, and are suitable for high-pressure service.

DESCRIPTION. Each Style 74 Clamp consists of a few, simple, "factory-made" parts (see cross section), which are quickly assembled with only one tool—a wrench. Sharp inner edge on clamp ring serves as anchor. Gasket is compressed tight against threads by set screws.

SIZES. Style 74 Clamps are available in sizes 3" I.D. to 10" I.D., inclusive.

HOW TO ORDER. Give: (1) quantity; (2) nominal size and outside diameter of pipe; (3) style number; (4) service—natural gas, manufactured gas, etc.; (5) maximum working pressure; and (6) type and dimensions of fitting to be clamped.

OTHER DRESSER REPAIR CLAMPS



Style 4 Collar Clamp is like Style 41, except made for sizes ¼" to 4" I.D. only.

Style 41 Collar Clamp stops leaks through threads of screw collars; sizes 4½ to 12" I.D., incl.

Style 55 Porous-Weld Clamp repairs porous circumferential pipe welds.

Style 77 Band Clamp stops leaks through small holes or pits in pipe.

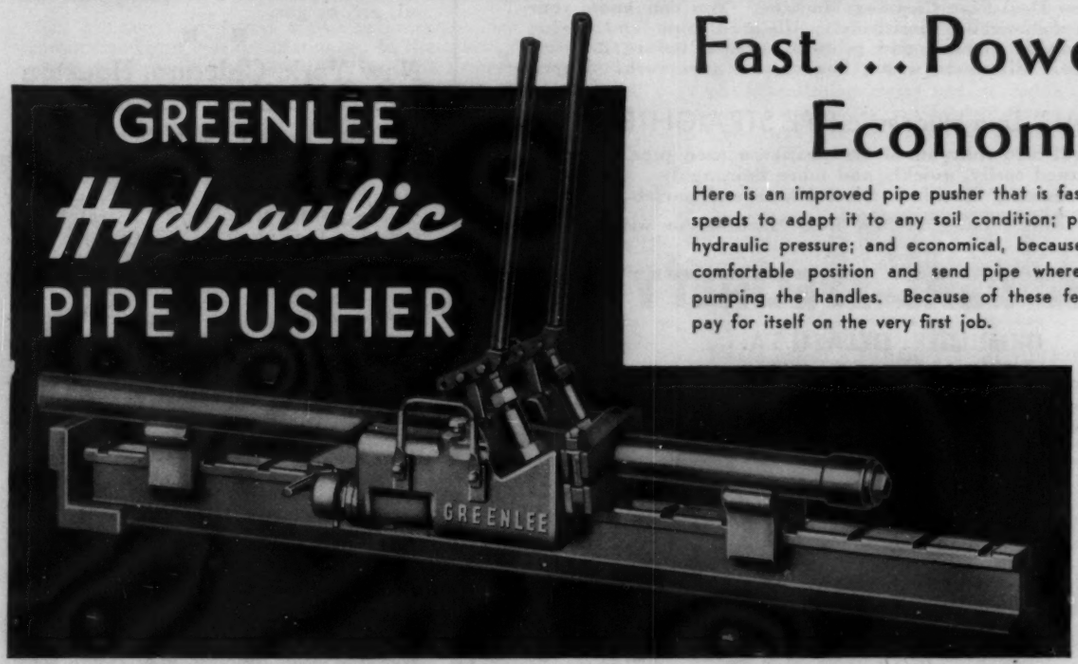
Style 78 Saddle Clamp repairs leaks in pipe 4" I.D. or smaller. Two or more can be butted together.

Style 79, Type 1, Split Repair Clamp fixes splits and pitted sections of pipe. Furnished also with one half-shell and stirrups (Type 2).

S. R. DRESSER MFG. CO.

BRADFORD, PA.

In Canada: Dresser Mfg. Company, Ltd., 60 Front St., W., Toronto, Ont.



Fast . . . Powerful . . . Economical

Here is an improved pipe pusher that is fast, because it has sufficient speeds to adapt it to any soil condition; powerful, because it utilizes hydraulic pressure; and economical, because one man can stand in a comfortable position and send pipe where it is wanted, simply by pumping the handles. Because of these features, it is often able to pay for itself on the very first job.

Write Now for Complete Details

The Greenlee Hydraulic Pusher is self-contained. It operates on a notched steel base, which permits making a push of from 4 to 7 feet, depending on the length of base used, without changing the pipe clamp. When it reaches the front end, it is pushed back and the quick-acting clamp is then reset. Pumping the handles sets up a pressure within two oil cylinders to push the pipe. This provides a smooth-acting, powerful mechanism. It will push pipe up to 4-inch and will exert a maximum pressure of 40,000 pounds on the pipe clamp.

GREENLEE TOOL CO., 1700 Columbia Ave., ROCKFORD, ILLINOIS

Clean Your Used Pipe Right Down to a Profit

With a "New Deal" Pipe Cleaning Machine

Hi-Speed Model on the Job

Down under the Dirt, Rust, Scale and Corrosion on your used pipe, there may be a real profit for you. If not, it'll be profitable not to put it back into use. You can either make a profit, or avoid a loss, if you use a New Deal Pipe Cleaning Machine. You can *know* your pipe quickly, economically, positively. All used pipe and casing should be thoroughly cleaned and properly graded before it is returned to service. Eliminate waste, hazard and guesswork. Buy a "New Deal."

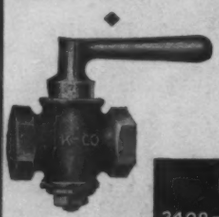
"NEW DEAL" Duo-Hydraulic PIPE STRAIGHTENERS

Crooked pipe will also rob you of the profit on used pipe. Straight pipe can be cleaned easily, quickly and more thoroughly. Get a New Deal Pipe Straightening Machine. Several sizes and models.

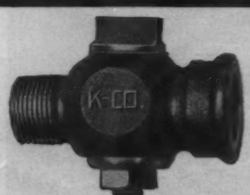
See 1937 Composite Catalog on New Deal Machines or write us for new company catalog.

The NEW DEAL SPECIALTY CO.
—INC.—
OKMULGEE, OKLA., U.S.A.
Export: LUCEY EXPORT CORP.
3505 Woolworth Bldg., New York, N. Y. Broad Street House, London, E. C. 2, England

GAS STOPS



G-207 Solid Lever Standard Gas Stop



G-491—High Pressure Roundway Gas Main Stop Male and Female

"by Kitson"
Surest Guarantee of Quality for Forty Years!

KITSON COMPANY
2409-15 Westmoreland St. Philadelphia, Pa.
Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters
Quality Brass Goods for Gas, Water and All Plumbing Uses
ESTABLISHED 1897

Look for the K-CO TRADE MARK

CRANE IRON GAS LINE COCK

New Crane Gas Cock For Curb Boxes Has Recessed Ends

To supplement its regular line of iron gas line cocks, Crane Co., Chicago, has added a new cock with recessed ends for use on curb box installations.

The new cocks are recessed at each end sufficiently to cover the entire threaded pipe surface. When the recesses are filled with a lubricant or paint to seal the space between the pipe and the inside of the cock opening, according to a company announcement, it protects both the cock and the pipe threads from outside contamination, thereby not only making a true connection, but adding to the life of the installation.

These new cocks are made with flat head, brass plug and washer. Body is of galvanized iron, in sizes ¾,- 1,- and 1¼-inch. They are air-tested to assure tightness, and are recommended for non-shock working pressure of 125 lbs. cold water, oil, air, or gas.

■ ■

New York, Chicago, Houston Dresser Offices Opened

S. R. Dresser Manufacturing Co., Bradford, Pa., manufacturers of flexible pipe couplings and pipe-line repair devices, on October 1 opened New York offices in the New York Central Building, 230 Park Ave. J. K. Crowell, consulting gas engineer and eastern representative, has headquarters at this new location.

A Chicago office was opened September 15, in the Peoples Gas Building, 122 South Michigan Ave. Chas. E. Norton, Chicago representative, is in charge.

On October 1, offices were also established in Houston at the Shell Building. H. R. Shidel, Southwest oil-field representative, will make his headquarters at this point.

■ ■

Tidewater Specifies Natural

Natural gas may be used under certain conditions in the $5,000,000 steam electric generating plant of Tidewater Associated Oil Co., which Pacific Gas and Electric Co. is building near Avon, Calif. The provision for natural gas was included in the contract.

■ ■

Bischoff Heads Koppers' Unit

Robert Bischoff, hydraulic engineer, has been placed in charge of all valve engineering for Koppers Co.'s Western Gas Division, Fort Wayne, Ind.

Traveling Gas Ovens Bake 150-lb. Birthday Drive Cakes

TRAVELING gas ovens, recently installed in Schrafft's on Twenty-third Street, New York City, baked the 150-pound birthday fruit cakes awarded to the 23 gas companies that won the refrigeration contest conducted by the American Gas Association and the Association of Gas Appliance and Equipment Manufacturers in co-operation with Servel Electrolux, Inc., to celebrate 10 years of gas refrigeration.

It was the largest batch of birthday cakes ever made, according to the Refrigeration Committee of these two associations. The combined weight of the cakes was nearly two tons. Into the batter went 852 pounds of raisins, 384 pounds of currants, 600 pounds of candied fruit, 192 pounds of pecans, and—12 pounds of salt. When Schrafft's took over the job there were no tins large enough for the 150-pound giants. Evergreens of frosting were used as decoration, illustrating gas refrigeration's theme of "Silent Cold."

■ ■

Northern Utilities Relays Line to Casper To Serve Standard Oil Refinery

Northern Utilities Co., Casper, Wyo., has purchased the 10-, 12-, and 14-in. gas line running from the Wertz gas field to Casper, formerly owned jointly by the Sinclair Wyoming Oil Co. and the Standard Oil Co. of Indiana, and is relaying it to carry gas from Big Sand Draw and Muskrat gas fields to Casper.

According to J. M. McIntire, vice-president of Northern Utilities Co., the new line parallels an existing 10- or 12-in. line. The acquired pipe is being removed from its old location, cleaned and reconditioned, then hauled to the new line and reconstructed as Dresser coupled line. Approximately 45 miles had been laid by October 27. The two lines are being tied together each five miles.

Northern Utilities Co. will supply gas to the Standard Oil Co. refinery, formerly supplied from the Mahoney Dome and Wertz fields.

■ ■

Standardize Six Kitchen Colors To Simplify Decoration

Six kitchen colors and eight bathroom colors have been standardized and will be introduced to the market on January 1, 1938, as a result of a year's work of the Housewares Group of the National Retail Dry Goods Association and the Commercial Standards Division of the National Bureau of Standards. Standardization was undertaken to simplify the retailer's problem of matching kitchen accessories.

The Bureau of Standards is to supply, at a cost of $10 for the set, a series of plaques displaying the standardized colors on porcelain enameled iron tile. The Bureau will also issue a booklet. The standardized colors for the kitchen are white, ivory, kitchen green, delphinium blue, royal blue, and bright red; for the bathroom, they are white, ivory maize, bathroom green, bathroom blue, royal blue, orchid and black. Wares meeting the standard will be so advertised.

■ ■

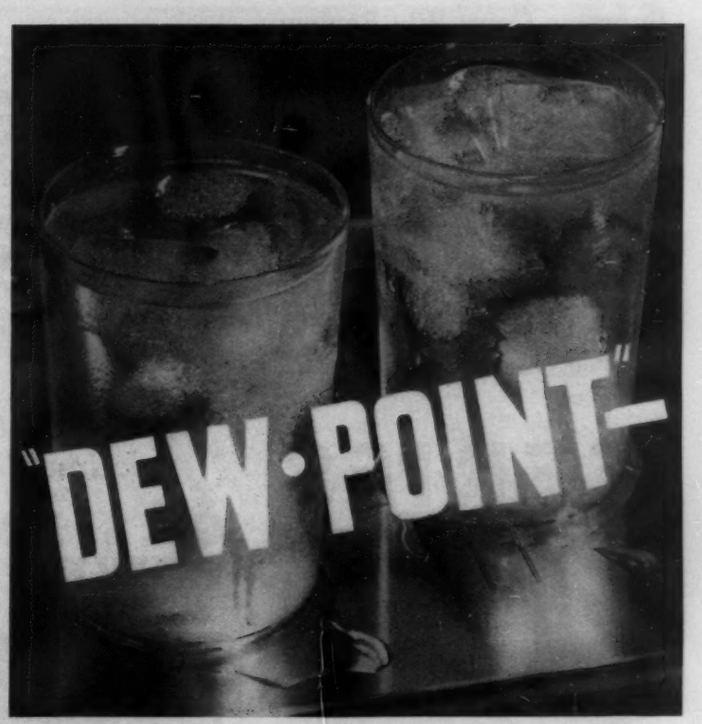
Experiments at Grand Coulee Show Electric Heat Too Costly

Experiments conducted at the Grand Coulee dam site on electrical heating of homes indicate that electrical heating is still in an experimental stage but may be made practical for a few wealthy persons, according to the conclusions of Dean H. V. Carpenter of Washington State College. He reviewed the Grand Coulee experiments at a recent meeting of the American Institute of Electrical Engineers held in Spokane. Professor C. E. Magnuson of the University of Washington upheld Dean Carpenter. Professor Magnuson, in a study of electrical house heating in Tacoma, found that other sources of heat must be provided in really cold weather.

■ ■

Gas Appliance Shipments Gain in 1937

Shipments of domestic gas consuming appliances showed outstanding gains during the first half of 1937. Gas-fired furnace shipments increased 113.8 per cent over the first half of 1936; conversion burners, 83.2 per cent; space heaters, 68.2 per cent; automatic gas water heaters, 48.8 per cent; gas-fired boilers, 38.9 per cent; hotel ranges, 35.4 per cent.



IS THE TEMPERATURE OF AIR WHEN IT NO LONGER CAN HOLD MOISTURE IN SUSPENSION

HOT, acid bearing gasses (products of combustion) from the furnace or heating plant pass up the cold chimney. This vapor is rapidly cooled below the "Dew Point" and is condensed into water. The water is absorbed by the porous highly absorbent walls of the chimney. When the stack cools, the water freezes and expands—enlarging cracks and producing others. A chimney may never crumble away, but constant repairs will always be necessary—and repairs ARE expensive. But installation of a porcelain enameled acid resisting inner liner pipe IS NOT expensive.

VITROLINER
the permanent Chimney Liner
Trade Mark

Remember Chimney Destruction Can Be Prevented

The largest utility companies in the Chicago Area have standardized on Vitroliner, the Permanent Chimney Liner.

Information and prices on Condensation equipment will be sent on request.

Please direct all Canadian inquiries to: Condensation Engineering Company, of Canada, Ltd., 196 King St., London, Ontario

CONDENSATION ENGINEERING CORPORATION
TELEPHONE MONROE 1031
335 South Western Avenue, Chicago

Supreme Court Will Review P. G. and E. Rate Case

The United States Supreme Court on October 11 granted a petition of the California Railroad Commission for a review of the ruling of the court in the Pacific Gas and Electric Co. gas rate case. Last June the court handed down a 4-to-4 ruling upholding an injunction against enforcement of the Commission's rate orders for the utility.

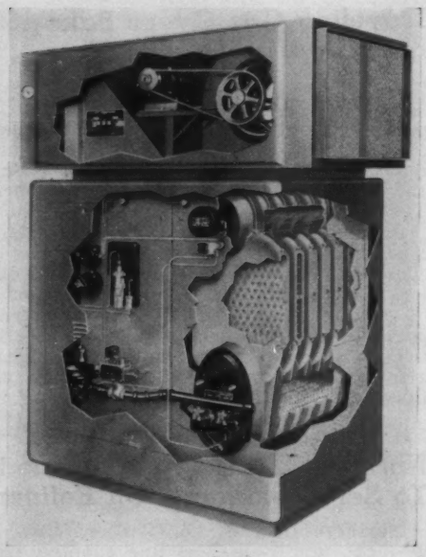
Two decisions are possible from this latest action of the Supreme Court. Its review may result in affirmation of its previous ruling or in resubmission of the case to the lower courts.

Since the California Railroad Commission's original order was issued, the company has reduced rates, approximating a cut of about $750,000 more than the cut ordered by the Commission. To meet the Commission's cut, if it is sustained, the company has impounded a total of $5,984,000. If the eventual decision is adverse to the company, it will mean a refund of $12 to every gas consumer on the company's system.

■ ■

Zenith System Names Gordon

Jackson L. Gordon is new manager for Zenith Gas System, Inc., at Mooreland, Okla. He succeeds Mr. and Mrs. Maynard Burdick, who have managed the office since 1930.



AGP Air Conditioner Based On Counter Flow Principle

The new AGP gas-fired air conditioner, Type 2-FE, heats, humidifies, filters, and circulates air, according to announcement by American Gas Products Corp. It is designed on an entirely new principle, the company states, built from the ground up to be a completely automatic direct-fired winter air-conditioning unit, rather than a typical warm air furnace converted to gas and with mechanical features added.

One of the important elements introduced into its design is the counter-flow principle. The fan unit, mounted on top, blows air down over the heating surfaces in counter flow to the upward passage of the products of combustion on the other side of this heating surface. The counter-flow principle of heat transfer increases to a maximum, the manufacturer explains, the rate of transfer of heat from metal to air, and reduces the weight and size of the heating sections.

In designing the cast iron heating sections, the time-tested extended pin heating surfaces used on AGP Ideal Gas Boilers has been used on the inner flue surfaces. These sections are made of cored cast iron and are assembled, in various numbers, into one complete heating unit at the factory. There is a single combustion chamber for all sizes. This makes only one thermostatic pilot necessary and reduces the pilot gas consumption to a minimum.

Safety is provided, the company states, by AGP controls, all of which are concealed within the casing.

■ ■

Mueller Describes Meter Bar

A three-color folder has been issued by the Mueller Co., Decatur, Ill., describing their rigid meter bar connections for reducing meter repairs. Particular emphasis is given to the bevel centering connector with an explanation of its working principle and a diagram of an installation. Five models of union outlet type conectors are shown with size specifications listed. Six models of the bevel centering connector are now being shown.

SERIES 10 CIRCUIT

Exclusive with Minneapolis-Honeywell

ONLY Minneapolis-Honeywell can offer the control performance made possible by the exclusive Series 10 Circuit. That is one important reason why it pays to standardize on this superior line of controls. In addition your service department can operate more efficiently and will have fewer calls, and your stock room will have to handle only one line to fill all control requirements. Minneapolis-Honeywell Regulator Co., 401 East 28th Street, Minneapolis, Minn.

MINNEAPOLIS HONEYWELL

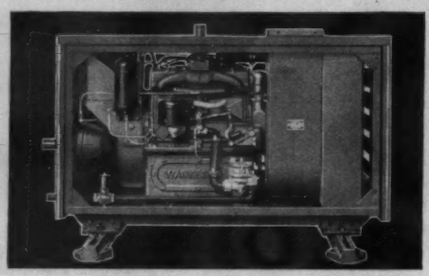
Control Systems

Fully Automatic Sound-Silenced

DELUXE

GAS ENGINE POWER UNITS

10 hp to 87 hp



For Residential and Commercial

AIR CONDITIONING AND REFRIGERATING

Equipment and all GENERAL POWER applications

★

Standard Gas Engines and Power Units, 10 hp to 350 hp

★

GAS POWER DIVISION

WAUKESHA MOTOR COMPANY

WAUKESHA WISCONSIN

BASO

THERMO ELECTRIC SAFETY CONTROL FOR GAS BURNING APPLIANCES

BOILERS ★ FURNACES ★ CONV. BURNERS ★ SPACE HEATERS ★ UNIT HEATERS ★ AIR CONDITIONERS OVENS ★ RANGES ★ WATER HEATERS, ETC.

MILWAUKEE GAS SPECIALTY CO.

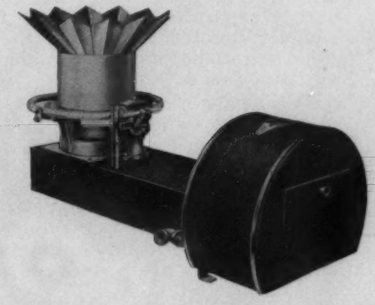
MILWAUKEE ★ WISCONSIN

GAS VALVE SERIES 500

ELECTRIC SWITCH SERIES 600

Establish New Conversion Records

with the
HOTZONE Welsbach
GAS FURNACE BURNER



HOTZONE GAS FURNACE BURNER

Many gas companies are already on the job with this easy-to-sell, easy-to-install, perfect-service gas conversion burner.

HOTZONE is a self-radiant burner that eliminates necessity of using refractory material . . . absolutely silent in operation . . . . requires no admixture of air and gas (hence no possibility of flash back.) No air shutters to adjust, no air ports to clog, no need for frequent cleaning.

It provides instant heat. Is compact. Fits all sizes of domestic furnaces and boilers. Gives maximum efficiency and completely automatic service—with low installation and operating cost.

Get busy now—establish new conversion records this fall—sell or rent this unit. Ask us to send you full details!

WELSBACH COMPANY

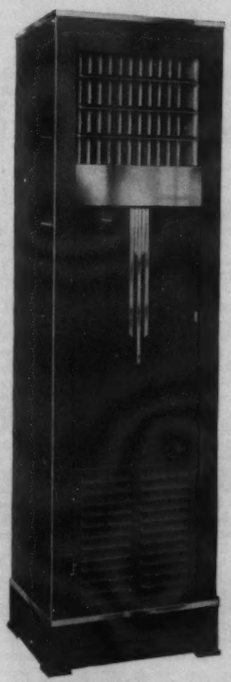
GLOUCESTER CITY, NEW JERSEY — BRANCHES IN CHICAGO AND SAN FRANCISCO

Since 1887, Pioneers in the Manufacture of Gas Appliances

NEW Markets

with the

HUMPHREY HEAT CABINET



SOME FOLKS ARE FUSSY. They object to radiators that absorb valuable floor space and catch dust. They do not like suspended type heaters, and they are equally averse to wall registers. For these particular people the No. 75 Humphrey Heat Cabinet is ideally suited. This stately, compact, forced air cabinet heater is a complete heating plant in itself. With an input rating of 75,000 B.t.u. per hour it is capable of handling many heating problems, economically and efficiently. The powerful blower type fan is quiet and positive in its operation and maintains a steady circulation of the room air. Write today for further interesting particulars concerning this Modern heater which is opening new fields for gas heat.

GENERAL GAS LIGHT CO., KALAMAZOO, MICH.

Ehlers Is Reynolds' Eastern Factory Representative

WILLIAM A. EHLERS has been appointed eastern factory representative by the Reynolds Gas Regulator Co. of Anderson, Ind.

Mr. Ehlers has been active in gas engineering and sales relations for 25 years. As sales staff manager of the public utility department, Johns-Manville Corp., New York City, he spent nine years in directing the sales of their products in the public utility field in the United States and Canada. He was industrial fuel engineer with the American Gas Association for six years. For two years he was manager of the industrial gas department of the Consolidated Gas, Electric Light & Power Co. of Baltimore.

Mr. Ehlers has been given charge of the Middle Atlantic territory for Reynolds, which covers the area from New York to South Carolina inclusive. His address is 49 South Clinton Street, East Orange, N. J.

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Hawarden Considers Change

The South Dakota Public Service Co., Canton, S. D., has asked the city of Hawarden, Iowa, to call an election to put before the voters the question of granting a franchise to the company to permit serving natural gas in the community.

Cooper-Bessemer Issues New Compressor Bulletin

An improved compressor unit, of the horizontal, gas engine-driven type, is described in a bulletin recently issued by The Cooper-Bessemer Corp.

This new unit, of either single or twin-cylinder design, identified as Type 12, embodies individual magnetos for each cylinder, placed close to the spark plugs and with ignition cables less than a foot long; a separate governor-valve for each cylinder, located right at the point of injection; and cam-operated, micrometer-adjusted fuel injectors.

The single-cylinder unit is rated 125 hp., and the twin-cylinder unit 250 hp., both at 200 r.p.m.

Accessibility to working parts is emphasized, and the bulletin states that all bearings—even in a twin unit—can be quickly adjusted. Power cylinders with positive water circulation and full pressure lubrication are features of this unit.

Mueller Gas Era Steel Furnace has outsold every other gas furnace for the past seven years. Long life, economical operation, satisfied customers are the answers.

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FURNACE COMPANY
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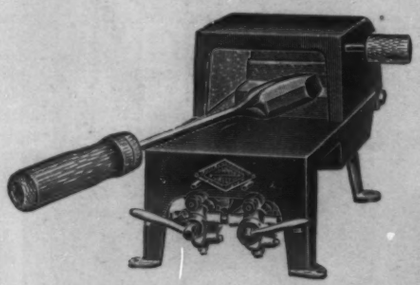
JOHNSON NO. 101 BENCH FURNACE



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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912 AND MARCH 3, 1933

Of GAS, published monthly, at Los Angeles, California, for October 1, 1937.

State of California, County of Los Angeles, California—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says that he is the Publisher of GAS, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:
Publisher, Jay Jenkins, 810 So. Spring St., Los Angeles, Calif.
Managing Editor, Arthur Rohman, 810 So. Spring St., Los Angeles, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)
Western Business Papers, Inc., 810 So. Spring St., Los Angeles, Calif.
Jay E. Jenkins, Los Angeles, California.
James E. Jenkins, Los Angeles, California.
Craig Espy, Chicago, Illinois.
George H. Finley, Santa Barbara, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is —. (This information is required from daily publications only.)

JAY JENKINS,
(Signature of Publisher.)

Sworn to and subscribed before me this 27th day of September, 1937.
(Seal) Dolores Bingham, Notary Public.
(My commission expires Sept. 13, 1940.)

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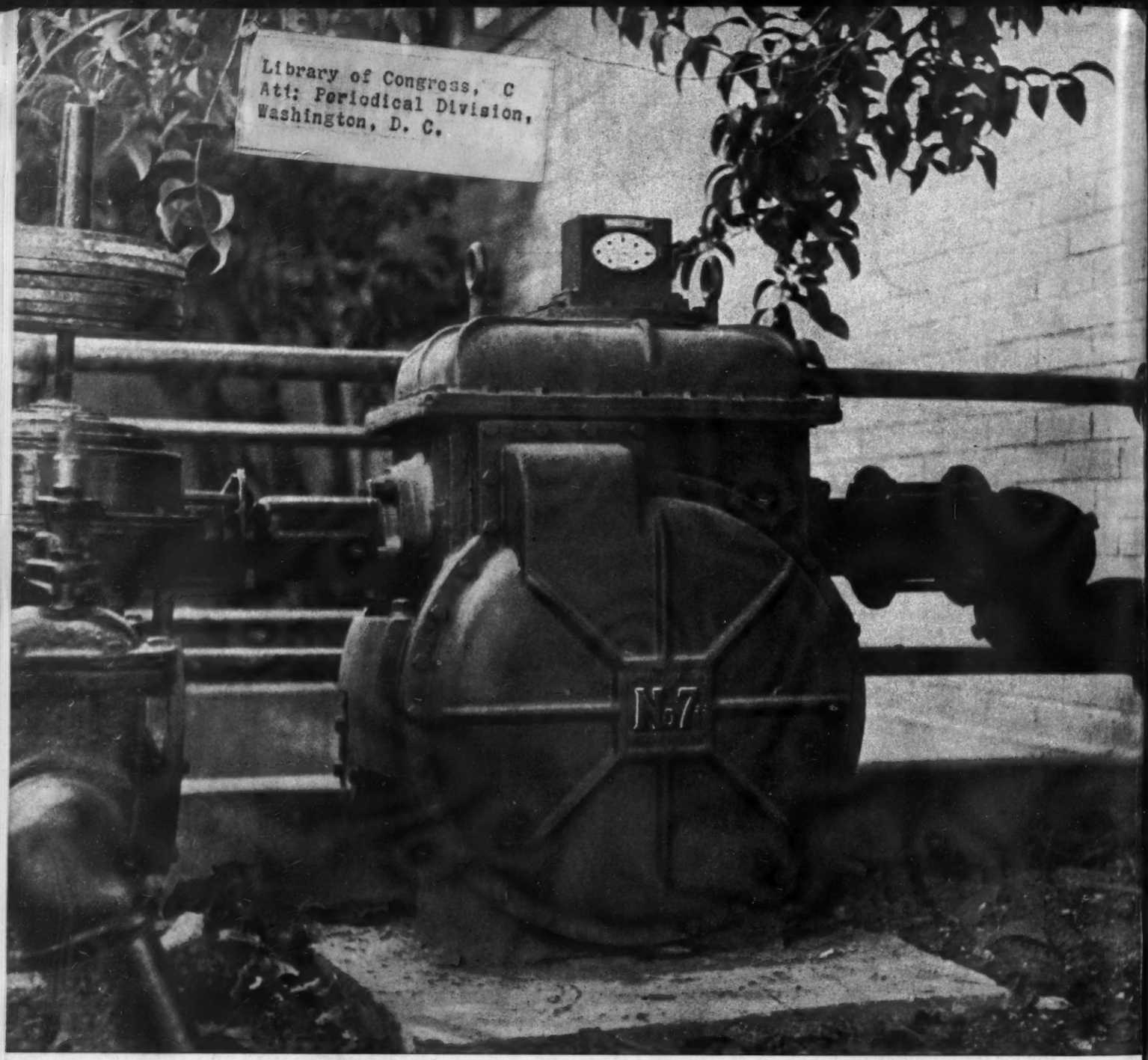

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